Solutia Inc.
575 Maryville Centre Drive
Saint Louis, Missouri 63141 USA

+1.314.674.1000 *phone*
+1.314.674.1585 *fax*
www.**solutia**.com

May 7, 2012

Mr. Bill Wentworth — *via Overnight Delivery*
Waste and Chemicals Management Division (3WC23)
USEPA Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103

Mr. Thomas Bass — *via Hand Delivery*
West Virginia Department of Environmental Protection – OER
Office of Waste Management
601 57th Street, SE
Charleston, West Virginia 25304-2345

Ms. Lisa Humphreys (2 Copies) — *via Overnight Delivery*
USACE Huntington District
CELRH-EC-CE
502 Eighth Street
Huntington, West Virginia 25701

RE: Final Caps and Covers Design Package
Solutia Site; 1 Monsanto Road, Nitro, West Virginia
EPA ID No. WVD039990965
Potesta Project No. 0101-01-0081-700C

Dear Bill, Tom, and Lisa:

As requested, attached please find Solutia Inc.'s final *RCRA Interim Measures Final Caps and Covers* Design Drawings and Technical Specifications for the Nitro, West Virginia site caps, covers and riverbank armoring. These drawings and specification were submitted as part of a May 5, 2012, Request for Proposal to the following eight potential bidders:

- Ahern, A Division of Kokosing Construction Company, St. Albans, West Virginia
- Beaver Excavating, Canton, Ohio
- Bizzack Construction, LLC, Lexington, Kentucky
- Central Contractors, South Charleston, West Virginia (a.k.a. Orders Construction)
- Elmo Greer & Sons, London, Kentucky
- ENTACT, LLC, Westmont, Illinois
- Shamrock Environmental, Greensboro, North Carolina
- Trumbull Corporation, Pittsburgh, Pennsylvania

The next key steps in the project schedule are:

- RFP Pre-bid meeting: May 16
- Receipt of bids: June 1
- Anticipated contract award date: on or about June 18, 2012
- Anticipated Mobilization: mid to late July 2012

If you have any questions on this information, please call me at (314) 674-6717, or I can be reached via e-mail at mlhous1@solutia.com.

Sincerely,

Michael House

Michael L. House
Manager, Remedial Projects
Solutia Inc.

MLH:DML/mh

Attachments

c: Ron Potesta, Mike Light - Potesta & Associates, Inc.

POTESTA
Engineers and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

To: Mr. Lee Anderson
Elmo Greer and Sons, LLC
313 N. US Hwy. 25
East Bernstadt, Kentucky 40729

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service
☐ Hand Carried ☐ Other: _____

Quantity	Description
1	Request for Proposal – Solutia Inc., Nitro, West Virginia RCRA Interim Measures Final Caps and Covers Installation
1 set	Drawings

Remarks: **Project key dates**:

- Pre-bid meeting: May 16, 2012
- Bid due date: June 1, 2012
- Anticipated award date: on or about June 18, 2012
- Anticipated Mobilization: mid to late July 2012
- Project Completion: December 31, 2014.

Cad Files Access:
FTP Address: **ftp://ftp.potesta.com**
FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

POTESTA
Engineers and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

To: Mr. Rob Ryan
Kokosing (Ahern)
5725 Kanawha Turnpike, SW
South Charleston, West Virginia 25309

Date: May 7, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☐ Federal Express ☐ United Parcel Service
☒ Hand Carried ☐ Other: _____

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By: Mike Light/mh

c: _____

POTESTA
Engineers and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

To: Mr. Bill Woodford
Trumbull Corporation
225 N. Shore Drive
Pittsburgh, Pennsylvania 15212

Date: May 4, 2012

Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service ☐ Hand Carried ☐ Other: _____

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By: Mike Light/mh

c: _____

POTESTA
Engineers and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

To: Mr. Lester Wimpy
Bizzack Construction, LLC
3009 Atkinson Avenue, Suite 200
Lexington, Kentucky 40509

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service
☐ Hand Carried ☐ Other: _____

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FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

POTESTA
Engineering and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-3031

To: Mr. Tim Aliff
Central Contracting, Inc.
515 Sixth Avenue
St. Albans, West Virginia 25177

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☐ Federal Express ☐ United Parcel Service
☒ Hand Carried ☐ Other: _____

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FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

POTESTA
Engineering and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 • Phone: (304) 342-1400 • Fax: (304) 343-9031

To: Mr. Rick Wigal
Shamrock Environmental
503 Patton Avenue
Greensboro, North Carolina 27406

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service
☐ Hand Carried ☐ Other: _____

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FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

POTESTA
Engineering and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 • Phone: (304) 342-1400 • Fax: (304) 343-9031

To: Mr. Mike Carofalo
The Beaver Excavating Company
2000 Beaver Place Avenue, SW
Canton, Ohio 44706

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service
☐ Hand Carried ☐ Other: _____

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FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

POTESTA
Engineers and Environmental Consultants

TRANSMITTAL LETTER

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

To: Ms. Tina Raap
ENTACT, LLC
1010 Executive Court, Suite 280
Westmont, Illinois 60559

Date: May 4, 2012
Project No.: 0101-01-0081-700C

Sent Via: ☐ Mail ☒ Federal Express ☐ United Parcel Service
☐ Hand Carried ☐ Other: _____

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FTP Username: **solutia2**
FTP Password (case-sensitive): **Solutia050412**

By: Mike Light/mh

c: _____

REQUEST FOR PROPOSAL

Nitro, West Virginia
RCRA Interim Measures
Final Caps and Covers Installation

Prepared for:

Solutia Inc.
PO Box 66760
St. Louis, Missouri 63166-6760

Prepared by:

Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, West Virginia 25304
Phone: (304) 342-1400 Fax: (304) 343-9031
Email: potesta@potesta.com

Project No. 0101-01-0081-700C

May 2, 2012

POTESTA

TABLE OF CONTENTS

APPENDICES

REQUEST FOR PROPOSAL

Nitro, West Virginia
RCRA Interim Measures
Final Caps and Covers Installation

1.0 GENERAL INFORMATION

1.1 Introduction

Solutia Inc. (Solutia) hereby requests your firm to prepare and submit a proposal for the construction of final caps and covers and related work (the "Work") located at the site of a former manufacturing plant in Nitro, West Virginia – (the "Site") as part of Solutia's installation of RCRA interim measures (the Project). Final caps and covers will be constructed as summarized below:

1. A segment of the Site riverbank will be stabilized. Approximately 2,355 linear feet of the right descending riverbank will be armored with limestone riprap placed over a geotextile separation layer. Work will be performed behind a floating turbidity control curtain wall and utilizing super silt fence as an erosion control measure.

2. Approximately 22.18 acres of low permeability cap will be constructed covering the footprint area of four soil-bentonite slurry walls constructed during 2011. Low permeability caps include the following layers from the bottom to the top: general soil fill layer, nonwoven geotextile, 40-mil smooth high density polyethylene (HDPE) geomembrane, drainage composite, and 18-inch vegetative soil cover layer.

3. Approximately 23.84 acres of low permeability cover will be constructed covering the specified areas of the Site. Low permeability covers include the following layers from the bottom to the top: general soil fill layer, 40-mil smooth HDPE geomembrane, nonwoven geotextile, and 18-inch vegetative soil cover layer.

4. Approximately 63.04 acres of permanent permeable cover will be constructed covering the specified areas of the Site. Permanent permeable covers include the following layers from the bottom to the top: regraded soils from on-site excavations placed as the general soil fill layer, nonwoven geotextile, and 18-inch vegetative soil cover layer.

The Work also includes related activities including construction of a surface runoff control system, installation and maintenance of sediment and erosion control best management practices (BMPs), installation of cap system underdrains, seeding and mulching, and other ancillary items as described in the Specifications and as shown on the Drawings.

In consideration of being given the opportunity to make a proposal for this Work, the bidder shall maintain all activities associated with this solicitation, including the review of this Request for

Proposal (RFP) and preparation of its proposal, in a confidential manner and shall not discuss or disclose any such information in any manner to persons other than its own personnel or subcontractors with whom bidder has placed similar confidentiality requirements without first obtaining Solutia's written authorization.

A copy (electronic or written) of your firm's proposal for the Work identified in this RFP must be submitted to each of the following individuals:

Attention: Mr. Michael L. House ("Solutia Representative")
Solutia Inc.
Manager, Remedial Projects
575 Maryville Centre Drive
PO Box 66760
St. Louis, MO 63141
Telephone: 314-674-6717
Fax: 314-674-8957
Email: mlhous1@solutia.com

Attention: Potesta & Associates, Inc. ("Solutia's Engineer")
c/o Mr. Michael Light
Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Telephone: 304-342-1400
Fax: 304-343-9031
Email: mlight@potesta.com

The deadline for submittal of proposals is **12:00 p.m. Eastern Daylight Time (EDT) on June 1, 2012.**

During the bid preparation period, questions or requests for clarifications should be submitted by email to both Mr. Michael House and Mr. Michael Light. Questions and responses will be emailed to all bidders simultaneously. The cutoff date for questions or requests for clarification is 12:00 p.m. EDT on May 18, 2012.

Bid packages shall include the following contractor information:

- Technical proposal describing the proposed approach to the Work, any exceptions or exclusions to the Specifications or Drawings, the bidder's qualifications and prior work experience on projects of this nature and scope, and other relevant information the bidder may wish to submit. The bidder including bidder's subcontractors and consulting advisors shall be experienced and competent to construct the specified caps and covers and in working in an environment with impacted soils and materials.

- Insurance certificates evidencing the insurance required in the RFP.
- Proposed changes, if any, to Solutia's Standard Contract Agreement and General Conditions of the Construction Contract Agreement (see below).
- Proposed Work schedule.
- Completed Cost Proposal Bid Form (included in Section 2.6).
- Resumes of Project Manager, Health and Safety Officer, as well as the Site Superintendent.

Solutia will review the proposals and select the successful bidder that best meets its interests. Solutia reserves the right to accept or reject any and all bids, and as needed, solicit additional bids, and/or modify the Work scope. Modifications to the scope may result in appropriate adjustments to the bidder's proposal.

The successful bidder hereinafter referred to as the "Contractor," will perform the Work as a contractor to Solutia. Solutia's Standard Contract Agreement and General Conditions of the Construction Contract, which specify the terms and conditions under which the Work is to be performed, are included as Appendices A and B, respectively. Any exceptions or proposed changes to these terms and conditions should be clearly marked on the sample contract and identified and included with the bid; otherwise, the Contractor is presumed to be in agreement with all terms and conditions contained therein.

1.2 Request for Proposal Organization

This RFP has been organized into three sections, which include the following:

Section 1.0 – General Information: Provides an overview of the Work to be performed and general information for the bidders.

Section 2.0 – Cost Proposal and Bid Form: Describes the format each bidder shall use to present costs associated with the Work summarized in this RFP. This section also includes the Cost Proposal Bid Form that will be used to record all cost proposals and other Project-related information associated with the Work summarized in this RFP.

Section 3.0 – Conditions of Work: Describes various conditions of the activities that are associated with the Work summarized in this RFP.

This RFP is supplemented by several attachments containing additional Project information, including:

- Appendix A – Solutia Standard Contract Agreement
- Appendix B – Solutia General Conditions of the Construction Contract

- Appendix C – Contractor Pre-Qualification Criteria
- Appendix D – Technical Drawings
- Appendix E – Technical Specifications
- Appendix F – Technical Submittal Register
- Appendix G – Project Change Order Request Form
- Appendix H – Daily Construction Activities Report
- Appendix I – Reference Documents (disk copy as identified in Section 2.3.2.2)

1.3 Scope of Work Overview

The Work on the Site is being undertaken as interim control measures under Solutia's Resource Conservation and Recover Act (RCRA) Corrective Action Permit ID WV039990965.

The Site was formerly a manufacturing plant most recently operated by Flexsys America L.P. as a chemical manufacturing plant from 1995 until 2004. Beginning in 2004, Flexsys America L.P. discontinued manufacturing operations and subsequently removed aboveground structures with removal activities completed in 2005.

The Site encompasses approximately 116 acres and is divided into two separate areas by Interstate 64. These areas are a southern area consisting of approximately 70 acres, which was the former Process Area (PA), and a northern area consisting of approximately 46 acres, which was the former Wastewater Treatment Area (WTA) and included the plant's wastewater treatment facility and wastewater impoundments.

The Project will include the construction of various caps and/or covers over existing Site surfaces that are believed to be affected from past manufacturing operations. The entire PA will be capped and covered including armoring of approximately 2,355 linear feet of the riverbank. The majority of the WTA will be capped and covered; however, no capping and covering is proposed at the northern end of the WTA nor along the riverbank of the WTA.

The Site is characterized as having poor surface drainage due to flat slopes. As a result, excavation and fill are proposed to promote surface runoff and drainage of the final surface of the caps and covers. An attempt was made to avoid excavation in areas where concrete slabs remain after removal of aboveground structures. However, bidders should anticipate that excavations planned for the Site will encounter concrete slabs, foundations, pavements, and buried piping.

Excavations are proposed in existing Site soils to generate material for use as fill in the general fill layer. This was judged more economical than importing soil from an off-site soil borrow source in order to achieve the desired subgrade for installation of caps and covers. Soil and other materials excavated from the Site shall be placed and incorporated first as part of the general soil fill layer in areas to receive the low permeability cap. If excess excavated material remains after placing the general soil fill layer in the areas to receive the low permeability cap, then Site excavated materials can be placed as the general soil fill layer under the low permeability cover and the permanent permeable cover.

Solutia has obtained a Section 404 permit from the US Army Corps of Engineers, a Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection (WVDEP), and a Stream Activity Permit from the West Virginia Division of Natural Resources (WVDNR) to allow the riverbank armoring Work to proceed. Solutia's intent is to complete riverbank armoring as one of the initial Project activities. Riverbank armoring includes excavation of riverbank soil and other materials. These excavated materials will be incorporated as part of the general soil layer as described above.

Riverbank armoring shall include clearing and grubbing of the riverbank, excavation of the riverbank to the slopes and configuration indicated by the Drawings, placement of a geotextile separation layer, and placement of a limestone riprap blanket. Work shall be performed in accordance with the conditions outlined in the approved permits. Riverbank armoring Work including excavation and placement of riprap shall be performed behind a floating turbidity control wall curtain to minimize sedimentation concerns in the Kanawha River. Relocation of an existing natural gas pipeline will be required in conjunction with the riverbank armoring Work.

Due to the size of the Project, Solutia is planning a multi-year effort to complete the caps and covers. The caps and covers will require importing over 264,000 cubic yards of clean soil from an off-site soil borrow area. With this in mind, Solutia has indicated to the regulatory agencies that up to three years may be required to complete installation of the final caps and covers.

Solutia has prepared a suggested sequence of construction contained in the technical specifications. It is possible that the Contractor may propose revisions to the suggested sequence of construction. Contractor revisions should be submitted to Solutia for review and approval prior to deviation from the suggested sequence of construction.

A main consideration of sequencing construction is that once the geomembrane, drainage composite or overlying geotextile, or the 18-inch vegetative soil cover layer have been placed, the Contractor must implement procedures to prevent contamination of these "clean" layers. The Contractor must prevent contamination of clean layers from construction traffic tracking soil from non-capped or non-covered areas onto capped or covered areas and also from airborne soil particles/dust from traffic or operations. The Contractor also must prevent contamination of clean layers from stormwater runoff that flows across non-capped or non-covered areas onto capped or covered areas. In general, Solutia desires that the order of construction of caps and covers begins by construction of the low permeability caps followed by construction of the low permeability covers. The Contractor will be responsible for remedying any contamination of clean layers caused by Contractor's failure to properly manage its Work to prevent such contamination.

Work to be completed in the PA includes riverbank armoring, construction of a surface runoff control system, construction of erosion and sediment controls including the Outlet 001 sediment basin, relocation of a natural gas pipeline, installation of a groundwater pumping system, and construction of low permeability cap, low permeability cover, and permanent permeable cover. Work in the PA will also include Work on property owned by the West Virginia Alcohol Beverage Control Administration (WVABCA). The Contractor will have to coordinate its schedule and activities with Solutia Project management and the WVABCA.

Caps and covers in the PA will include 17.75 acres of low permeability cap, 7.57 acres of low permeability cover, and 47.63 acres of permanent permeable cover. Work at the WVABCA property includes construction of an area of low permeability cap, excavation and removal of 12 inches of surficial soils from an area south of the WVABCA warehouse and replacement with clean soil placed over a geotextile, and excavation and removal of 18 inches of surficial soils from the drainage swale and replacement with clean soil placed over a geotextile.

Upon completion of installation of the final caps and covers in the PA, the Contractor will clean sediments from the surface runoff control system (corrugated plastic pipes and drop inlets) and consolidate sediment within the Outlet 001 sediment basin and apply a geotextile and clean cover layer of soil over the basin.

Work to be completed in the WTA includes construction of a drainage channel and drainage swales, construction of erosion and sediment controls including the Outlet 003 sediment basin, installation of a groundwater pumping system, and construction of low permeability cap, low permeability cover, and permanent permeable cover.

Caps and covers in the WTA will include 4.43 acres of low permeability cap, 16.27 acres of low permeability cover, and 15.41 acres of permanent permeable cover.

Upon the completion of installation of final caps and covers in the WTA, the Contractor will consolidate sediment within the Outlet 003 sediment basin and apply a geotextile and clean cover of soil over the basin.

Bidders should consider the following when developing their proposals.

- The Site was developed and used as a chemical manufacturing facility since around 1910. Excavations are likely to encounter buried utilities, foundations, pavements, obstructions, etc. The plan is to utilize excavated materials on the Site where fill is required.

- It is possible that excavations could encounter waste materials and impacted materials. The Contractor must implement and work under an appropriate Health and Safety Plan (HASP) including personal protective equipment (PPE) and other procedures to protect Contractor personnel and the public.

- Solutia's standard during the Work for fugitive dust emissions from the Site is that visible dust will be unacceptable. The Contractor shall monitor site conditions and implement dust suppression measures and controls before visible dust occurs. Solutia will conduct air monitoring at the perimeter of the Site to evaluate the potential for off-site volatiles and particulate matter. Air monitoring data will be shared with the Contractor and if monitoring results and/or visual observation indicate on-site and/or off-site air quality issues, the Contractor shall modify its Work practices to control excessive emissions. This may include watering or the

use of other dust or vapor suppressants. The Contractor shall be responsible for air monitoring within Contractor-Work areas to ensure worker health and safety.

- The Contractor will be required to implement a stormwater runoff and water management plan during construction. The Drawings and Specifications include the minimum requirements for the erosion and sediment control plan including necessary best management practices to be installed, operated, and maintained during construction.

- The Contractor shall be responsible for surveying for layout of all Work associated with the final caps and covers.

1.4 Scope of RFP Activities

In general, this RFP requires the performance of several activities by the Contractor including, but not limited to:

- Review of the Project specific Health and Safety Plan (HASP) developed for the Project, and acceptance/adoption of the HASP or revision and upgrade of the HASP. The Contractor's HASP as well as any subsequent revisions shall be provided to Solutia prior to commencement of work and promptly after each revision.

- Development of a detailed construction schedule by area (PA, WTA, and riverbank), by cap and cover type, and by each discreet layer, task, or component of the Work. The Contractor's schedule shall be provided to Solutia with the bid and updated on a periodic basis as necessary. Updates shall show the actual status of the Work completed as well as remaining Work and shall be submitted to Solutia promptly after each revision.

- Preparation of various materials submittals, test results, and other information required by the RFQ and contract documents.

- Mobilization to the Site of required equipment, materials, and manpower.

- Performance of all necessary Site preparation activities including, but not limited to, installation and maintenance of erosion and sediment control measures, survey control for layout of the Work, utility awareness and protection, and traffic control and security measures for the Site.

- Implementing and maintenance of a stormwater runoff plan (erosion and sediment control plan) so that surface water runoff discharged from Contractor Work areas is in compliance with West Virginia National Pollutant Discharge Elimination System (WVNPDES) benchmark effluent guidelines.

- Dust control sufficient to prevent visible dust.
- Clearing of existing vegetation from Work areas.
- Installation of groundwater pumping system components.
- Excavation and fill required to achieve the proposed subgrade elevations for riverbank armoring, caps, covers, and sediment basins.
- Installation of the stormwater runoff control system including drainage channel, drainage swales, drop inlets, and pipes.
- Installation of riverbank armoring including floating turbidity control curtain, geotextile, and rock riprap.
- Installation of the various layers of the final caps and covers including low permeability cap, low permeability cover, permanent permeable cover, and Work on the WVABCA property (soil removal, geotextile separation layer, and clean soil replacement).
- Placement of off-site soil borrow material be used in the final caps and covers. Solutia will provide off-site soil borrow material under a separate contract with a third-party provider (Solutia's off-site soil borrow provider). The Contractor shall coordinate work with Solutia's off-site soil borrow provider including receiving shipments of soil, stockpiling, transporting, spreading, compaction, and finish grading.
- Construction quality assurance testing associated with installation of the HDPE geomembrane.
- Revegetation of disturbed areas.
- Construction of stone-surfaced access roads.
- Demobilization of equipment and materials from the Site.

1.5 Qualifications of Contractor

Solutia requires that all Contractors, and certain Subcontractors, be qualified through Browz Group, LLC (Browz), an independent verification and certification company, prior to performing any Project-related activities. A list of the criteria required to qualify through Browz is included as Appendix C to this RFP.

As part of the Contractor's bid proposal, Solutia requires that the Contractor submit a list of all Subcontractors expected to perform Work at the Site. This Work includes, but is not necessarily limited to, the following activities: Site earthwork, surveying, environmental monitoring, material delivery, support facilities, geosynthetic materials supply and installation, riverbank armoring Work, and restoration (seeding/mulching). The list shall include the following Contractor (i.e., Contractor submitting bid proposal) and Subcontractor information.

- Company name
- Company address
- Description of service(s) provided
- Insurance certificate
- Experience Modifier Rate (EMR) for the past three years
- Recordable Incident Rate for the past three years
- Lost Workday Incident Rate for the past three years

Solutia will utilize the description of service information to identify the likely risk category (i.e., low to high) and, therefore, the necessity for Browz certification for each Subcontractor. For the Subcontractors identified as requiring Browz certification, the EMR and incident rate information for each Subcontractor will be used to determine if the Subcontractor is likely to meet the minimum acceptable certification criteria. This preliminary review process will allow Solutia to better evaluate the Contractor's overall qualifications and to identify contracting conditions that may require further consideration by Solutia. It should be noted that this preliminary qualification review process does not eliminate the need for the Contractor and Subcontractors to fully prepare the forms necessary for Browz certification.

Solutia may make such investigation, as it deems necessary, to determine the qualifications of the Contractor to perform the Work. The Contractor will furnish to Solutia all information and data that Solutia may request for this purpose. Solutia may reject a proposal if the evidence submitted by, or investigation of, such Contractor fails to satisfy Solutia that such Contractor is properly qualified to carry out the obligations of the Contract and complete the Work contemplated therein. Conditional bids will not be accepted.

The proposal must include a Certificate of Insurance or provide other documentation indicating the Contractor's ability to meet or exceed the following minimum Project insurance requirements, and the Contractor's acknowledgement to accept the following requirements with respect to identification, selection, and responsibility for Subcontractors:

	Type Of Insurance Coverage	**Limits Of Liability**
i)	Workers' Compensation	Statutory
ii)	Employer's Liability	$1,000,000 each accident $1,000,000 disease – each employee $1,000,000 disease – policy limit

	Type Of Insurance Coverage	Limits Of Liability
iii)	Commercial General Liability (Including Bodily Injury, Property Damage, Products and Completed Operations and contractual liability on an occurrence form of policy naming Solutia as additional insured)	$2,000,000 each occurrence, combined single limit
iv)	Comprehensive or Commercial Automobile Liability (Bodily Injury or Property Damage including coverage for all owned, non-owned and hired vehicles naming Solutia as additional insured)	$1,000,000 each occurrence, combined single limit
v)	Umbrella Liability Insurance affording excess coverage over the underlying primary insurance required by subparagraphs ii), iii) and iv) hereof, and naming Solutia as additional insured	$10,000,000 each occurrence and annual aggregate
vi)	Contractor's Pollution Liability	$1,000,000 each occurrence and annual aggregate

The Contractor is required to: i) furnish Solutia with certificates of insurance acceptable to Solutia evidencing such insurance coverage prior to the start of Work by Contractor and at any other time reasonably requested, ii) name Solutia as "Additional Insured" and provide a Waiver of Subrogation in form and substance satisfactory to Solutia, and iii) provide general liability insurance as an "occurrence" form of policy. The certificates of insurance shall be current and effective (i.e., no expired dates).

The proposal must identify all Subcontractors the Contractor proposes to utilize in performance of the Work. Solutia reserves the right to reject any Subcontractor proposed by the Contractor. The Contractor will retain liability for the errors and omissions of all Subcontractors. Subcontractors will be required to complete the Solutia qualification and safety history forms described above.

The Contractor shall identify a Project Manager that will serve in this role throughout the duration of the Work. No substitutions of the Contractor's listed Project Manager will be allowed without prior approval by Solutia.

1.6 Workplace Safety Information

Solutia places a great emphasis on workplace safety and its goal is zero incidents. The Contractor will furnish to Solutia all information specified below related to workplace safety. Solutia may reject any proposal if the information submitted by such Contractor fails to satisfy Solutia that such Contractor is properly qualified to carry out the Work specified herein in a safe and responsible manner. The following workplace safety information is required to be submitted by the Contractor along with the completed Cost Proposal Bid Form (Section 2):

- Signed copies of OSHA 300 Logs from 2009, 2010, 2011, and a copy of the 2012 log complete through the date of the proposal.

- Letter from insurance carrier indicating Contractor's current Workman's Compensation Experience Modification Rate (EMR).

1.7 Mandatory Pre-Bid Meeting and Site Visit

Contractors submitting a proposal are required to send representatives (two people maximum) to the Pre-Bid Meeting and Site Visit on May 16, 2012 beginning at 9:00 AM EDT. The Pre-Bid Meeting will be held at the Potesta & Associates, Inc. offices at 7012 MacCorkle Avenue, SE, Charleston, West Virginia 25304. As part of the Site Visit, prospective Contractors will have the opportunity to inspect the Site. Please confirm your intent to attend the Pre-Bid Meeting and Site Visit by email to Mike Light at mlight@potesta.com.

1.8 Proposal Instructions

A completed proposal must include one original, signed Cost Proposal Bid Form. The Cost Proposal Bid Form is contained in Section 2.6 of this RFP, and all entries must be clearly entered. If the proposal is made by a corporation, the legal corporate name must be given and the proposal signed by an authorized officer of the corporation. If the proposal is made by a partnership, the official name as it appears on the Assumed Name Certificate must be given and the proposal signed by a partner. If the proposal is made by a sole proprietorship, the proposal must be signed by the individual owner. Names and titles of all persons signing must be typed or printed below their signatures. All attachments, certifications, and/or acknowledgments attached to the proposal form must be executed in the same manner as the proposal.

In addition, the following items are also required to be submitted in response to this RFP:

- Contractor rates in accordance with Section 1.10 - Contractor Rates.
- A valid copy of the Contractor's Insurance Certificate.
- A list of proposed Subcontractors in accordance with General Information Section 1.11 – Subcontractors.
- Workplace safety information as specified in Section 1.6 – Workplace Safety Information.
- Identify proposed sources of soil materials required for the Work that are imported from off-site sources.

At its discretion, Solutia may reject any proposal not prepared and submitted in accordance with the provisions hereof. Any proposal may be withdrawn by the prospective Contractor prior to the deadline for submittal of proposals (or authorized postponement thereof). Any proposal received after the time and date specified may not be considered by Solutia.

At the time of the opening of proposals, it will be presumed that each Contractor has read and is thoroughly familiar with this RFP and has inspected the Site areas subject to final caps and covers installation and other related construction. The failure or omission of any Contractor to examine any form, instrument, or document or visit the Site will in no way relieve any Contractor from any obligation with respect to its proposal.

1.9 Project Schedule

For the purposes of developing a proposal, the Contractor should assume that the Contract for this Work will be awarded on or about June 18, 2012, and mobilization to the Work Site(s) shall occur on or about mid to late July 2012. The Contractor is advised that Solutia's compliance schedule with the regulatory agencies requires that all Work related to construction of the final caps and covers be completed by December 31, 2014. Therefore, a necessary requirement for this contract for installation of the final caps and covers is that all Work be completed by December 31, 2014.

The Contractor shall develop and submit a detailed scheduling showing timelines for completion of the activities specified herein. The Contractor shall consider the information presented in the RFP and supporting documents in preparing the Work schedule including, but not limited to, limitations (if any) regarding the days and hours of on-site Contractor activities, coordination with others, regulatory agency requirements and permit conditions (specifically for riverbank Work), and the time of year the Work is to be conducted. In accordance with Section 3.7 – Construction Schedules, the Contractor will be required to periodically update the Work schedule for review by Solutia.

1.10 Contractor Rates

In responding to this RFP, Contractors must provide their most current hourly labor rates and hourly, daily, weekly, and monthly equipment rental rates. Solutia will use these schedules as a basis for evaluating any Contract Price increases or decreases in response to change orders, credits, or out-of-scope services when Solutia approves such Work. With its submittal of these rates, Contractors acknowledge that the labor rates and equipment rental rates will be valid for the anticipated duration of the Project (expected completion by December 31, 2014).

1.11 Subcontractors

The proposal must include a list of all Subcontractors (if any) proposed for use in the Work. This list will be considered in the evaluation of the proposals and will be deemed to be a condition of the Contract, and no addition or substitution of a Subcontractor will be permitted without the prior approval from Solutia. Solutia's only contractual relationship, however, will be with the Contractor.

1.12 Addenda

No interpretation of the meaning of the RFP will be made orally. Requests for such interpretation must be addressed (either hard copy or email) to Solutia and Solutia's Engineer (Potesta & Associates, Inc.) as follows:

Attention: Mr. Michael L. House
Solutia Inc.
Manager, Remedial Projects
575 Maryville Centre Drive
PO Box 66760
St. Louis, MO 63141
Telephone: 314-674-6717
Fax: 314-674-8957
Email: mlhous1@solutia.com

Attention: Mr. Michael Light
Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Telephone: 304-342-1400
Fax: 304-343-9031
Email: mlight@potesta.com

To be given consideration, all requests must be received at the above address (either hard copy or email) by 12:00 p.m. EDT on May 18, 2012. Any and all such interpretations and any supplemental instructions will be in the form of written addenda, which will be sent to all holders of the RFP by May 25, 2012. Failure of any Contractor to acknowledge receipt of any such addenda will not relieve said Contractor from any obligation under its proposal as submitted. All addenda so issued will become part of this RFP.

1.13 Precedence

In the case of identified discrepancies among any components of this RFP or the final Contract Documents, the Contractor will provide notice to Solutia. Unless otherwise directed, precedence among the components of the Contract Documents will be in the following order:

1. Change Orders
2. Solutia's Contract Agreement
3. Addenda (later dates taking precedence over earlier dates)
4. Project Specifications (Appendix E)
5. Technical Drawings (Appendix D)
6. Conditions of Work (Section 3)
7. Cost Proposal Bid Form (Section 2)
8. General Information (Section 1)

- END OF SECTION -

2.0 COST PROPOSAL BID FORM

2.1 Introduction

As compensation for performing the activities summarized in this RFP, Solutia will reimburse the selected Contractor in accordance with the terms in the Standard Contract Agreement (Appendix A) to be executed between Solutia and the Contractor. Reimbursements will be conducted on a lump sum basis for project management, health and safety administration, support facilities, mobilization, demobilization, site access, riverbank armoring, stormwater runoff and water management, surface runoff control system, WVABCA drainage swale, excavation and fill to obtain general fill layer surface, low permeability cap construction, low permeability cover construction, permanent permeable cover construction, seeding and mulching, stone surfaced access road construction, WVABCA soil removal/replacement, and groundwater pumping system.

The proposal must include a completed and signed Cost Proposal Bid Form for Final Caps and Covers Installation. All cost quotations are to include all applicable taxes.

In completing the Cost Proposal Bid Form the Contractor acknowledges that all labor, equipment, materials, subcontractor fees, taxes, expenses, permits, and any other costs incurred by the Contractor and any Subcontractors are included in the cost proposal, and that the cumulative costs of the separate cost proposal items represent all of the activities and materials required of the Contractor and any Subcontractors to complete the Work. In addition, the Contractor acknowledges that the descriptions provided in this section are general and do not necessarily include all activities associated with a given cost proposal item. Other components of this RFP provide additional details for executing the Contract.

As further discussed in Section 2.3 – Cost Proposal, a "baseline" lump sum cost proposal must be provided for the Work described herein. In addition, in response to this RFP, Solutia also requests that each Contractor provide a detailed breakdown of all costs associated with the "baseline" lump sum cost proposal. The detailed breakdown will include a complete list of Work activities, assumed quantities, and extended bid costs (for each item, this will be determined by multiplying the unit cost by the assumed quantity). Solutia reserves the right to request additional unit cost details or revisions to the detailed breakdown prior to Contractor selection or during the Project Work. The breakdown of costs must be equal to or less than the total bid price. The Contractor can provide additional details if the Contractor desires.

In addition to providing cost proposals for the Work items specified in this RFP, Solutia also requests that the Contractor consider and present in the bid proposal, opportunities for Work cost reductions (if any are identified). Such reductions might be related to materials of construction, construction methods, and/or schedule efficiencies.

2.2 Format of Cost Proposal

The remainder of Section 2 is presented in four sections. The purpose and content of each section are briefly described as follows:

Section 2.3 – Cost Proposal: Describes the format of the requested cost proposal, including a general description of the Work activities to be included with each bid item.

Section 2.4 – Pricing: Identifies divisions of the Work for which Solutia requires lump sum pricing for the final caps and covers.

Section 2.5 – Retainage: Identifies Solutia's intended withholding of a pre-determined retainage amount pending the satisfactory completion of Contractor activities and submittals subsequent to the date of substantial completion.

Section 2.6 – Cost Proposal Bid Form: Includes the form on which the Contractor is to provide the following:

- The cost proposals for the various components associated with the Work identified in this RFP.
- Cost proposals for alternate bid items.
- The proposed Subcontractor(s) and soil fill material source(s) to be utilized for the Work subject to this RFP.
- Acknowledgment that all addenda have been received and authorization to execute the Cost Proposal Bid Form

In addition to the Cost Proposal Bid Form, each Contractor must also provide a detailed breakdown of all costs associated with the "baseline" firm lump sum cost proposal for the Project Work to be performed.

2.3 Cost Proposal

The Contractor shall develop firm lump sum bid amounts for performing the Project Work specified in this RFP. The Contractor's bid amounts shall include all costs associated with the performance of the following Work activities based on the scope of Work, limits of construction and additional information specified in this RFP and associated Project documents.

It is the Contractor's responsibility to understand and verify the nature, character, quality, and quantity of all conditions to be encountered. Since the Site is a former manufacturing facility, the Contractor should assume that excavation could and will encounter abandoned piping and utilities, concrete foundations, and other obstructions. Any reliance on the RFP and information made available by Solutia will be at the Contractor's risk. The Contractor agrees that it will neither have

nor assert against Solutia any claim for damages for extra Work or otherwise for relief from any obligation of this Contract based on the accuracy of the Contract Documents and other furnished information.

2.3.1 Project Management

The Contractor shall provide a qualified Project Manager who will oversee construction activities for the Work. The Project Manager shall be available for meetings with Solutia throughout the duration of the Work. Assume one meeting per week lasting approximately one hour. Participation of the Project Manager can be via telephone conference call.

The Contractor shall provide a qualified Site Supervisor who will direct the Contractor during construction activities and be on-site at all times during construction activities, unless authorization for absence is obtained from Solutia.

2.3.2 Health and Safety

Prior to initiation of any on-site activities, the Contractor will develop a Project HASP, certified by an appropriately qualified safety professional, that identifies the health and safety procedures, methods, and requirements to be implemented by the Contractor during the performance of construction activities. The Contractor may consult and utilize the HASP developed and provided by Potesta & Associates, Inc. and/or develop its own HASP as long as it includes, at a minimum, the requirements of the Potesta & Associates, Inc.-developed HASP. The Contractor's HASP shall cover all personnel who will be employed by the Contractor to perform remedial Work at the Work Site, including direct employees as well as Subcontractors. If the Contractor does not wish to include Subcontractors under its HASP, then each Subcontractor will be responsible for developing and implementing a HASP that meets the requirements outlined in this RFP. The Contractor will be responsible for ensuring that all of its Subcontractors have adequate HASPs prior to on-site Work by the Subcontractor and are adhering to the HASPs during their Work activities. If a Subcontractor agrees to be included under the Contractor's HASP, then a statement to this effect shall be submitted to Solutia. The minimum requirements/conditions that shall be included in the Contractor's (or any of its Subcontractor's) Project-specific HASP are discussed below. In any event, the Contractor shall be solely responsible for developing and implementing a HASP to protect its employees, subcontractors, the public, and the environment.

2.3.2.1 Chemical Hazards

The following constituents-of-concern for this Site have been identified based on analytical test results from historical studies of the Site. These analytical tests included volatile organic compounds, semi-volatile organic compounds, asbestos and dioxin. Laboratory results identified various levels of the following constituents in and around areas of the planned final caps and covers installation Work. These constituents may be contained in site soils, groundwater, sediment or wastes:

- Aniline

- N-Nitrosodiphenylamine
- Total TCDF Dioxin
- Total TCDD Dioxin
- OCDD Dioxin
- Trichloroethylene
- Vinyl Chloride
- Benzene
- Chlorobenzene
- 1,4-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,1-Dichloroethylene
- Ethylbenzene
- Isopropylbenzene
- Toluene
- Cis-1,2-Dichloroethene
- o-Xylene
- m.p-Xylene
- Carbon Tetrachloride
- Naphthalene
- 2,4,6-Trichlorophenol
- Tetrachloroethene

These constituents are known to exist at this Site in the subsurface soils and in waste materials which were encountered in the previously completed subsurface exploration and sampling efforts. The potential exists for workers to be exposed to these constituents. Care should be taken to assure that proper personal protective equipment (PPE) is provided to all workers entering the Work areas and that proper decontamination procedures are followed. It should be noted that the potential chemical hazards should not be limited to the above noted constituents. Care should be taken to evaluate any unknown odors, staining or other conditions encountered during the Work to promote protection of the workers' health and safety.

Decontamination activities performed shall consist of washing reusable equipment with a biodegradeable detergent solution or a biodegradeable solvent when it is to be removed from the exclusion zone. This Work is to be conducted at a decontamination area which will be located at a centralized Site location(s) to be determined by the Contractor subject to approval of Solutia.

Additional potential chemical exposure hazards exist for workers during excavation associated with the final caps and covers installation. Preliminary to the Site-wide demolition-to-grade in 2004, decontamination procedures were conducted by the Site operator at that time, to remove chemicals from pipelines, including those below grade. However, no subsurface pipelines were removed. Therefore, there is the potential that any pipeline that is uncovered during the clearing process may contain hazardous chemicals. Before cutting, plugging or removing any pipeline, protective measures must be employed to avoid accidental exposure of personnel to unknown chemicals. In

addition to the chemicals listed above, raw materials that are known to be utilized at the Site during the time of shutdown include, but may not be limited to:

- Chlorine
- Cyclohexylamine
- Hydrogene peroxide (20% - 40%)
- Tertiary butylamine
- Carbon disulfide
- Liquid caustic soda (50%)
- Toluene
- Hydroquinone
- Isoamylenes
- Nitrosomorpholine
- 2-Ethylhexylacrylate
- Ethylacrylate

2.3.2.2 Reference Documents

The following documents are available for reference to the Contractor in preparing the HASP. Copies of these documents on CD are being included with the RFP as Appendix I.

1. Roux Associates, Inc., RFI Report and Stabilization/Corrective Measures Plan, Monsanto Nitro Plant. May 5, 1995.

2. Potesta & Associates, Inc., PDA Waste Characterization Investigation – Final, Flexsys Nitro Plant, June 2004.

3. Potesta & Associates, Inc., Kanawha River Bank Stabilization and Residue Cleanup, Interim Measures – Final Report, Flexsys Nitro Facility, February 2004.

4. Potesta & Associates, Inc., Final Draft Expanded RCRA Facility Investigation Report, Solutia Nitro West Virginia Site, February 16, 2007.

5. O'Reilly, Talbot, and Okum Associates, Inc., Health and Safety Plan, Kanawha River Bank Stabilization and Residue Cleanup, Flexsys Nitro Plant Facility, MP42.1, Nitro, West Virginia, July 26, 2002.

6. Potesta & Associates, Inc., Health and Safety Plan, Interim Measures, Geotechnical Study, Solutia Nitro Site, Nitro, West Virginia, May 11, 2010.

7. Key Environmental, Inc., Health and Safety Plan (HASP), RCRA Interim Measures, Soil-Bentonite Slurry Wall Installation, Nitro, West Virginia, Revised June 3, 2011.

8. Potesta & Associates, Inc., Health and Safety Plan, Interim Measures, Caps and Covers Installation, Solutia Nitro Site, Nitro, West Virginia, November 18, 2011.

Item 8, Health and Safety Plan, Interim Measures, Caps and Covers Installation, was provided to USEPA, WVDEP, and COE for their review and approval of the Work Plan for the Final Caps and Covers Project. The Contractor's HASP must comply at a minimum with the provisions and procedures listed in this HASP.

2.3.2.3 Minimum HASP Requirements/Conditions

Prior to commencement of construction activities, the Contractor must certify that personnel employed at the Site, including employees and Subcontractors, have completed 40-hour Occupational Safety and Health Administration (OSHA) training (and annual refresher training) in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. The Contractor must also certify that any individuals who later became employed by the Contractor also receive such training prior to performing Work at the Site.

The Contractor must certify that all personnel who will be employed by the Contractor to perform Work, including direct employees as well as Subcontractors, have received the initial and annual (if applicable) medical examinations and are enrolled in an on-going medical surveillance program as required by 29 CFR 1910 and 29 CFR 1926.

The Contractor must also comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

The Contractor will be responsible for the safety of its employees, Subcontractors, suppliers, and other parties at the Site as a result of the Contractor's direction and/or Work.

The Contractor must prepare, submit, and implement a HASP in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. The plan must address, but not be limited to, the following components:

- *Identification of Key Personnel*: Identify, by name and by title, the on-site and off-site health and safety personnel responsible for the implementation of health and safety procedures. All on-site personnel involved in the measures must have OSHA 40-hour Hazardous Waste Training (29 CFR 1910.120 and 1926.65) and the corresponding 8-hour refresher course update.

- *Training:* Each designated employee, operator, and driver must have completed applicable training and licensing.

- *Drug Testing:* The Contractor's drug testing program will be submitted to Solutia for review prior to commencement of construction activities. Solutia reserves the right to require additional testing for Project personnel. At a minimum, the

Contractor must certify to Solutia that all Site personnel have had a negative drug test in accordance with Solutia policy.

- *Medical Surveillance:* Certify that all supervisory and on-site personnel have received appropriate medical examinations and are able to conduct the tasks required for the Work for this Project.

- *Task-Specific Hazard/Risk Analysis:* Identify and provide a means of mitigating all foreseeable biological, chemical, and physical hazards associated with the Work including, but not limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, materials handling, Work around excavated areas, and Work near water.

- *Work Zones:* Provide a Site plan which depicts the designation of zones, including: (1) Exclusion Zones, (2) Decontamination Zones, and (3) Support Zones. The level of personal protection required for each zone must be included.

- *Personal Safety Equipment and Protective Clothing:* Identify personal safety equipment and protective clothing to be available at the Site and used by Project personnel. This shall include identifying expected levels of protection (EPA Protection Levels A, B, C, and D) for each task and the action levels for personal protective equipment (PPE) upgrades. A respiratory protection program that meets the requirements of 29 CFR 1910.134 and establishes specific requirements for respirator use shall be included.

- *Personal Air Monitoring:* Identify protocols and criteria associated with personal air monitoring of on-site personnel.

- *Personnel Decontamination:* Describe methods and procedures to be used for personnel decontamination.

- *Confined Space Entry:* Describe procedures for confined space entry in accordance with OSHA's Confined Space Standard.

- *Material Safety Data Sheets:* Provide Material Safety Data Sheets (MSDSs) for all materials to be brought on Site, as well as constituents which are expected to be encountered in the course of implementation of the remedial activities.

- Construction Safety Procedures (OSHA 1926.1 - 1926.652, Subpart A-P) to address excavation shoring and trenching safety, as well as a daily Site safety inspection checklist to evaluate these items.

- Standard Operating Procedures (SOPs) and Safety Programs as required by applicable sections of 29 CFR 1910 and 1926.

As part of the overall health and safety program, the Contractor must include specifications for equipment decontamination, worker hygiene, worker-protection, a personal protective equipment program, and dust control program in the HASP. The specified programs must address all aspects of the Work required by applicable state and federal regulations, including OSHA regulations.

Particular care shall be taken to avoid spreading impacted materials outside of the Work areas or on "clean" surfaces within the Work areas. Clean surfaces include geosynthetic layers of the caps and covers, as well as the 18-inch vegetative soil cover layer. The envisioned operations plan includes keeping the layers of the caps and covers as clean surfaces once placed. This includes developing Work plans and practices to prevent contamination of clean surfaces from excavated materials, materials tracked from construction equipment, dust from the operations, and sediments carried by storm water. The Contractor will be responsible for the remedying of any contamination of clean layers caused by Contractor's failure to properly manage its Work to prevent such Contamination.

During implementation of the Work, the Contractor will monitor conditions and, as necessary, implement dust control measures. Contractor shall keep up-to-date records of health and safety monitoring results for inspection by Solutia.

The Contractor will identify a qualified Health and Safety Officer (HSO) who will monitor and enforce Contractor compliance with all provisions of the HASP. During implementation of the Work, the Contractor will ensure that all Contractor employees and Subcontractor personnel have been provided with, understand, and abide by the provisions of the HASP. The HSO will conduct a health and safety orientation in conjunction with Work startup; will conduct tailgate safety meetings at least once daily; and will provide a health and safety orientation to any Contractor or Subcontractor employees working at the Site following the initial health and safety orientation meeting. Results of all safety meetings and audits will be documented and provided to Solutia's Engineer on a weekly basis. The HASP will be kept on-site at all times and accessible to Solutia and all Project personnel.

Determination of the appropriate level of worker safety equipment, procedures, or modification(s) to equipment/procedures based on Site conditions must be made by the Contractor as a result of Site visits, review of available information, and anticipated construction activities.

Should the Contractor identify any unforeseen or Site-specific safety-related factor or hazard, or should a condition become evident during the performance of Work at the Site, it will be the Contractor's responsibility to bring such to the attention of Solutia both orally and in writing as quickly as possible for resolution. In the interim, the Contractor should take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

Should the Contractor seek relief from or substitution for any portion or provision of the HASP, such relief or substitution must be requested to Solutia in writing, and if approved, be authorized in writing.

Any disregard for the provisions of these health and safety requirements will be deemed just and sufficient cause for termination of the Contract without compromise.

The Contractor shall be responsible for on-site air monitoring at Work areas to ensure that workers and Subcontractors are not exposed to harmful constituents.

The HASP and all Subcontractor HASPs, may be organized as a single document, which will include Site-specific information.

2.3.3 Support Facilities

The Contractor shall provide support facilities, including, at a minimum, the following:

- *Utilities*: There are no utilities available at the Site other than at the former guard house at the main gate. Solutia is in the process of running overhead electric to water pumping areas near Outlet 001 which should be in place prior to commencement of the Work. Contractor will provide for electrical power, either by generator or a metered connection to the closest power supply. A power drop exists near the former guard house. Contractor will be responsible for providing its own potable and non-potable water at the Site. Contractor will provide cellular phones and/or radios for key Contractor personnel.

- *Fuel Storage*: Fuel for construction equipment and generators will be stored in an appropriate container with secondary spill containment. Refueling of construction equipment directly from a licensed fuel delivery service vehicle is acceptable. In the event of any fuel spill, Contractor will be responsible for reporting spills to the appropriate agencies and Site clean up, if necessary, including disposal of any contaminated soils at an appropriate disposal facility at no additional cost to Solutia.

- *Security*: Contractor will provide for the security of its equipment and temporary facilities. Solutia assumes no responsibility for losses due to theft, vandalism, or any other occurrence. In addition, Solutia will not be responsible for lost or damaged personal effects belonging to Contractor or Subcontractor personnel.

- *Trailer*: If necessary, the Contractor will provide a locking trailer equipped with working electric lighting, heating, and air conditioning for field offices and secure storage. The Contractor will also be responsible for payment of all utility expenses.

- *Sanitary Facilities*: The Contractor will provide adequately maintained toilet, eyewash, and hand washing facilities. Contractor will provide a trailer-mounted tank or other conveyance to provide water at the Site.

- *Trash Disposal*: The Contractor will provide receptacles for disposal of household-type trash and debris. The Contractor must provide for disposal of accumulated trash at least once per week.

- *Potable Water*: Contractor shall make suitable arrangements for potable water.

- *Drinking Water*: The Contractor will provide clean, chilled drinking water, which shall be accessible to all Site personnel.

2.3.4 Mobilization

Prior to commencement of construction activities, the Contractor will mobilize all personnel, equipment and materials to the Site. This includes, but is not limited to, field trailers, office equipment, portable sanitary facilities, and other incidental facilities necessary to allow Work to proceed.

2.3.5 Demobilization

Following the completion of construction activities, the Contractor will clean the Site, dispose of all miscellaneous trash and debris on the Site (including debris present before the initiation of the Work), and expeditiously demobilize all Work equipment and facilities.

2.3.6 Site Access

Prior to the initiation of construction activities, the Contractor will make the following improvements to the Site:

- *Warning Signs and Fencing around Work Areas*: The Contractor will install and maintain high-visibility temporary construction fencing or other suitable barricade and signage around each Work area, as necessary and appropriate, during performance of the Work.

- *Traffic Control and Rerouting*: The Contractor will place and maintain barricades and signage on facility roadways to redirect traffic around the Work area, and alert traffic to the presence of trucks entering and leaving the Work area during performance of the Work. Traffic control will be necessary to help maintain clean surfaces from being impacted from Site soils, dust and surface water runoff.

- *Monitoring Well Protection*: The Contractor will install high visibility temporary construction fencing or other suitable barricade around monitoring wells and other permanent facilities near or within the Work area to prevent accidental damage during construction activities.

- *Utilities*: The Contractor will identify and mark existing utilities on and near the Site in order to avoid impacts to or damage to the utilities.

Roadways: Access to the Site by public roadways includes two possible routes, one north of Interstate 64 (I-64) and one south of I-64. Access to the former main entrance is Route 25 to

Pickens Road and right on Flexsys Drive to the main gate. These roads are paved public roadways. Access to the gate north of I-64 is Route 25 to McJunkin Road, then turn onto a gravel road just north of the I-64 overpass bridge beside the car dealership (Turnpike Chevrolet). This gravel road leads to a gate along the eastern property line at WTA. The gravel road is privately owned.

The Contractor shall be responsible for any damage caused by transporting any equipment, materials, and supplies to the Site, whether caused by the Contractor, Subcontractor, or material suppliers. This applies to public and private roads that are impacted by the Project. Roads shall be maintained in existing or better condition throughout the course of the Project. In addition, the Contractor shall be responsible for maintaining the surface of the gravel road from McJunkin Road to the WTA and shall employ dust control measures when this road is used. This includes dust control during deliveries of soil from the off-site soil borrow source by Solutia's soil provider.

2.3.7 Dust Control

The Contractor shall be responsible for controlling dust from areas contained within the Project work limits. Dust control will be required for worker health and safety, to avoid nuisance dust impacts off-site, and to avoid contamination of clean surfaces installed by the Contractor as part of the final caps and covers. The Contractor shall implement measures and procedures to avoid and control fugitive dust. This shall include phasing of construction operations, minimizing traffic over Work areas, application of water or other Solutia-approved dust suppressants, or other appropriate measures. Visible dust shall be unacceptable. The Contractor shall monitor Site conditions and implement dust suppression measures and controls before visible dust occurs.

The Contractor is cautioned that dust from his operations could impact clean layers installed as part of the final caps and covers. The Contractor will be responsible for remedying any contamination of clean layers caused by the Contractor's failure to properly manage its Work to prevent such contamination.

2.3.8 Riverbank Armoring

The Contractor shall implement best management practices (super silt fence) and the turbidity control wall curtain prior to ground disturbance. Contractor shall cut vegetation from riverbank armoring Work area at the ground line. Existing fencing along the top of the riverbank shall be removed. Vegetation removed above the existing ground line shall be chipped and hauled off-site to a permitted solid waste landfill. Contractor shall grub stumps. Stumps shall be ground to mulch and mixed with soil to be placed under the caps and covers. Contractor shall relocate the natural gas pipeline to avoid conflicts with the riverbank excavation. Contractor shall excavate riverbank soil and debris, and place excavated material under the caps and covers. Contractor shall place geotextile separation layer and rock riprap in accordance with the plan. Contractor shall grout riprap below existing outfalls.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the Work, and incidentals required for a proper installation.

2.3.9 Stormwater Runoff and Water Management

The Contractor is responsible for implementing, constructing, inspecting, maintaining, and repairing best management practices in order to provide erosion and sediment control downgradient of all Contractor Work areas. This shall also include implementing and maintaining measures to prevent stormwater runoff from non-capped and non-covered areas from flowing across or coming into contact with the surfaces of clean layers of the caps and covers. Contamination of clean layers (geotextile, geomembrane, drainage composite, and 18-inch vegetative soil cover layer) shall be avoided. The Contractor will be responsible for remedying any contamination of clean layers caused by the Contractor's failure to properly arrange its work to prevent such contamination.

The Contractor shall install silt fence and super silt fence as shown on the Drawings. Additional silt fence and super silt fence may be required to improve the control of stormwater from disturbed areas. The Contractor shall maintain silt fence and super silt fence and replace silt fence and super silt fence when it becomes ineffective or damaged.

Contractor shall construct and maintain stabilized construction entrances. The Contractor's operations shall include measures to avoid tracking mud or objectionable material onto public roadways and paved roadways on the Site that will remain after capping.

The Contractor shall construct, operate, and maintain the Outlet 001 sediment basin. Construction shall include excavation to the required dimensions, preparation of subgrade suitable to receive the geomembrane liner, installation of 40-mil HDPE geomembrane liner, and construction of principal spillway (including piping, concrete riser, valves, pressure treated wood walkway, platform, steps, and other ancillary devices). Contractor shall remove sediment from the basin when accumulation of excessive sediments interferes with operation of the basin. Upon the completion of the final caps and covers, Contractor shall consolidate sediments in the northern end of the basin and cover the entire basin with geotextile and 18 inches of clean soil cover.

The Contractor shall construct, operate, and maintain the Outlet 003 sediment basin. Construction shall include preparation of the foundation area to receive the compacted earthen embankment, construction of the earthen embankment, installation of 40-mil HDPE geomembrane over the upstream slope of the embankment, construction of the principal spillway (including piping, concrete riser, valves, pressure treated wood walkway, platform, and steps), emergency spillway, and other ancillary items. Contractor shall remove sediment from the sediment basin when accumulation of excessive sediments interferes with operation of the basin. Upon the completion of the final caps and covers, Contractor shall consolidate sediments in the upper end of the basin and cover the basin with geotextile and 18 inches of clean soil cover.

Contractor shall provide and maintain drop inlet protection devices around drop inlets as they are constructed and following construction.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.10 Surface Runoff Control System

The Contractor shall install 12, 18, 24, 30, and 36-inch diameter corrugated plastic pipes including excavation, handling and placement of excavated material under the caps and covers, bedding, pipe and installation of backfill. Contractor shall clean sediments from corrugated plastic piping after final caps and covers construction is complete.

The Contractor shall install concrete drop inlets including steel grates. Included will be excavation, connection and grouting of pipes, backfill and cleaning of sediments from the drop inlets after caps and covers construction is completed.

The Contractor shall construct drainage channel and drainage swales as shown by the Drawings including excavation, handling and placement of excavated materials under the caps and covers, geotextile, clean soil cover layer, revegetation, and erosion control matting.

The Contractor shall patch asphalt removed as part of corrugated pipe installation and drop inlet repair or installation in the entrance/parking area near the former front gate/guardhouse.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.11 WVABCA Drainage Swale

This item includes work in the drainage swale area on property owned by WVABCA. The Contractor shall excavate and remove 18 inches of existing soil from the drainage swale work area as delineated on the Drawings, remove and place excavated materials under the low permeability cap, place a geotextile separation layer, place 18 inches of clean cover soil, install riprap protection, install erosion control matting, and revegetate the area.

2.3.12 Excavation and Fill to Achieve General Fill Layer Surface (Cap Subgrade Elevations)

This item includes excavation and fill as shown on Drawing Nos. 2, 3, and 4 and the riverbank cross sections (Drawing Nos. 13 through 16). Drawings 2, 3, and 4 show proposed contours that represent the surface of the general fill layer under the proposed low permeability caps and low permeability covers. This item includes excavation (unclassified) of soil, pavements, rubble, piping, etc.) and other materials encountered and placement of excavated materials as general fill to the lines, grades, and elevations shown on the Drawings. Excavation is also shown in the areas of the proposed permanent permeable cover in order to promote drainage. Tolerance for grading shall be to within plus or minus 0.1-foot of the grades and elevations shown on the Drawings.

In the event that additional fill material is needed to achieve the proposed general fill grades, this fill material shall be soil from the off-site soil borrow source, supplied by Solutia's off-site soil borrow provider.

The riverbank cross sections also show excavation. Excavated materials from the riverbank shall be placed as fill to achieve the proposed general fill surface elevations in the areas of the proposed caps and covers.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.13 Low Permeability Cap

The Contractor shall prepare the subgrade to receive the low permeability cap, install the geotextile cushion layer, install the 40-mil HDPE geomembrane, install the drainage composite, place the 18-inch vegetative soil cover layer (soil supplied by Solutia's off-site soil borrow provider), and construct the cap system underdrains (perforated and solid wall).

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials (except Solutia-provided soil), labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.14 Low Permeability Cover

The Contractor shall prepare the subgrade to receive the low permeability cover, install the 40-mil HDPE geomembrane, install the geotextile layer, place the 18-inch vegetative soil cover layer (soil supplied by Solutia's off-site soil borrow provider), and construct the cap system underdrains (perforated and solid wall).

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials (except Solutia-provided soil), labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.15 Permanent Permeable Cover

This item includes preparing the subgrade of the area to receive the permanent permeable cover, installation of the geotextile separation layer, and placing the 18-inch vegetative soil cover layer (soil supplied by Solutia's off-site soil borrow provider).

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials (except Solutia-provided soil), labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.16 Seeding and Mulching

This item includes furnishing and the application of lime, fertilizer, seed and mulch. The Contractor shall prepare the seedbed prior to seeding and shall be responsible for the maintenance of seeded areas.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.17 Stone Surfaced Access Roads

Contractor shall place drainage pipes to allow runoff to drain under the access road, geotextile, and stone surfacing materials at the locations shown on the Drawings.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.18 WVABCA Soil Removal Area

This item includes Work near the southwest corner of the WVABCA warehouse building, on property owned by WVABCA. The Contractor shall establish temporary fencing to restrict the movement of pedestrians and WVABCA employees from the WVABCA property into the Work areas. The Contractor shall excavate and remove 12 inches of soil from the area indicated on the plans. Excavated soil shall be placed under the low permeability cap or low permeability cover. Contractor shall place geotextile over the excavated surface and place 12 inches of clean soil cover (soil supplied by Solutia's off-site soil borrow provider) over the geotextile. The area should then be seeded and mulched.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials (except Solutia-provided soil), labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.3.19 Groundwater Pumping System

This item includes furnishing and installation of the groundwater pumping system components that will be installed within the Nitro property existing soils prior to covering with the final caps and covers. The Contractor shall construct Pump Stations 1, 2, and 3 including the concrete wet wells, valve vaults, stainless steel piping, aluminum access covers and frames, wooden control panels, conduit, and connections to polyethylene DR 11 PE 3608 piping. The Contractor shall also construct 3-inch DR 11 PE 3608 force main piping including cleanouts as shown on the Drawings. Contractor shall install 2-inch DR 11 PE 3608 polyethylene piping from the wet wells to the groundwater pumping wells and two 1-inch diameter Schedule 80 PVC conduits with pull chords from each groundwater pumping well to the control panels. Contractor shall install concrete

manhole sections and aluminum access covers and frames at each groundwater pumping well location.

Work shall be completed in accordance with the Drawings and Technical Specifications. The Contractor's lump sum price shall include all materials, labor, installation, maintenance of the work, and incidentals required for a proper installation.

2.4 Pricing

The bid amounts for each Work item should be developed as a "stand alone" cost. There shall be neither additional fees to complete each identified activity nor any redundant fees among the various bid items.

Solutia anticipates that the firm lump sum cost proposal submitted by prospective Contractors on the Cost Proposal Bid Form (Section 2.6) will be used in combination with the Contractor's rate schedule (Section 1.10) to develop and approve costs for changes to the Work (if necessary). Therefore, the cost proposals included on the Cost Proposal Bid Form will be valid through completion and final acceptance of all Work.

2.4.1 Firm Lump Sum Cost

As indicated above, the "baseline" firm lump sum cost indicated on the Cost Proposal Bid Form should include all Work described above and as shown and described by the Drawings and Technical Specifications except for and as may be indicated elsewhere in this RFP. Contractors must submit a detailed breakdown of all costs associated with the "baseline" firm lump sum cost. In developing these cost proposals, prospective Contractors must consider that the activities associated with the final caps and covers installation and other related Work shall be performed in accordance with the minimum requirements established in this RFP.

2.4.2 Cost Breakdown for Budget and Accounting Purposes

The Cost Proposal Bid Form includes a list of the significant parts or activities associated with the Project. The cost breakdown is to help in evaluating and comparing bids. Bidders may provide additional cost breakdown beyond that shown on the bid form for items at their discretion.

The Cost Proposal Bid Form also includes a requirement for each Bidder to designate the portion of the total firm lump sum contract amount to be completed each year (i.e., 2012, 2013, and 2014).

2.4.3 Proposed Subcontractors

The Cost Proposal Bid Form includes a section where each Bidder will indicate proposed Subcontractors to be utilized for the Project.

2.4.4 Proposed Soil Borrow Sources

Solutia has elected to supply soil from an off-site soil borrow area for items that require clean soil or clean soil cover. The Contractor shall coordinate with Solutia and Solutia's soil provider to include communicating when soil is needed. Contractor shall be responsible to designate locations on the Site where Solutia's off-site borrow soil provider will stockpile soil for use in the Work.

2.4.5 Addenda Acknowledgment

Bidders shall acknowledge receipt of addenda.

2.5 Retainage

Solutia will withhold payment ("retainage") in the amount of 10% of the total of each invoice pending Solutia's determination that the Work is substantially and satisfactorily complete. Such Work activities that must be complete include, but are not necessarily limited to, watering and maintenance of vegetation and seeded areas, submittal of Record Drawings (Section 3.13) and submittal of any other Project documentation required herein or otherwise requested by Solutia. Once these activities are completed to the satisfaction of Solutia, the Contractor may submit a final invoice for release of the retainage amount.

2.6 Cost Proposal Bid Form

As indicated in Section 2.4, the firm lump sum bid amounts entered on the cost proposal bid forms are anticipated to be the basis for compensation for the Work.

COST PROPOSAL BID FORM

Nitro, WV RCRA Interim Measures
Final Caps and Covers Installation

Bidder Name: _____

Bidder Address: _____

_____

_____

Contact Name: _____

Title: _____

Signature: _____

Date: _____

Email: _____

Telephone: _____

Activity – Description	Units	Cost Proposal
Item 1.0 - Project Management - Includes project management, Site Superintendent, schedule development and updates, attendance at Project meetings, preparation of Record Drawings, preparation and submittal of miscellaneous documentation, and general Project overhead.	Firm Lump Sum	
Item 2.0 - Health and Safety Administration – Includes review of existing HASP and reference documents, HASP development and preparation, conduct of HASP training, HASP monitoring and revision/update of HASP as necessary, compilation of training and surveillance records as necessary for all Site personnel, on-site air monitoring, personal protective equipment, and other items necessary to assure compliance with 29 CFR 1910.120, 29 CFR 1926.65, and the approved HASP.	Firm Lump Sum	
Item 3.0 - Support Facilities – Includes installation and maintenance of support facilities, as needed, including utilities, water supply, trash disposal, sanitary facilities, etc.	Firm Lump Sum	
Item 4.0 - Mobilization – Includes mobilization of all required labor, materials, and equipment to the Site.	Firm Lump Sum	

Activity – Description	Units	Cost Proposal
Item 5.0 - Demobilization – Includes demobilization of all required labor, materials, and equipment from the Site including Site cleanup and restoration.	Firm Lump Sum	
Item 6.0 - Site Access – Includes erecting fencing and barricades, traffic control, construction and maintenance of roadways and repair of any damage caused by use of roadways to transport equipment and materials to the Site.	Firm Lump Sum	
Item 7.0 – Dust Control – Includes controlling dust from the work area in order to prevent health and safety concerns, off-site fugitive dust, and contamination of clean layers of the final caps and covers from fugitive dust.	Firm Lump Sum	
Item 8.0 - Riverbank Armoring – Clearing and grubbing, relocation of natural gas piping, unclassified excavation of debris and soils, transport and placement of excavated materials under caps and covers, furnishing and maintaining turbidity control curtain, super silt fence, geotextile, rock riprap, and other incidentals associated with riverbank armoring.	Firm Lump Sum	
Item 9.0 - Stormwater Runoff and Water Management – Installation, maintenance, and replacement of silt fence, super silt fence, stabilized construction entrances, drop inlet protection, rock check dams, and other best management practices. Installation and maintenance of Outlet 001 sediment basin and Outlet 003 sediment basin including geomembrane, principal spillways, emergency spillways, excavation, fill, and other incidentals.	Firm Lump Sum	
Item 10.0 - Surface Runoff Control System – Excavation, installation, bedding, and backfill of 12-inch, 18-inch, 24-inch, 30-inch, and 36-inch corrugated plastic pipes; excavation, installation, and backfill of drop inlets; construction of drainage swales and drainage channels, and miscellaneous construction associated with the final stormwater runoff control system.	Firm Lump Sum	
Item 11.0 - WVABCA Drainage Swale – Excavation, transport, and placement of excavated materials under the caps and covers, placement of geotextile layer, placement of off-site clean borrow soils over drainage swale area, placement of riprap and erosion control matting.	Firm Lump Sum	

Activity – Description	Units	Cost Proposal
Item 12.0 - Excavation and Fill to Achieve General Fill Layer Surface (Cap Subgrade Elevations) – Excavation of Site soils, foundations, pavements, obstructions and fill to achieve the grades and elevations shown on the General Fill Surface and Site Plan. This item also includes placing clean off-site soil borrow (supplied by Solutia's off-site soil borrow provider) as needed to achieve the proposed elevations and grades.	Firm Lump Sum	
Item 13.0 - Low Permeability Cap – Preparation of cap subgrade, installation of geotextile, 40-mil smooth HDPE geomembrane, drainage composite, 18 inches of vegetative soil cover layer (supplied by Solutia's off-site soil borrow provider), cap system underdrains (both perforated and solid wall), and other incidentals associated with the low permeability cap.	Firm Lump Sum	
Item 14.0 - Low Permeability Cover – Preparation of cover area subgrade, installation of 40-mil smooth HDPE geomembrane, geotextile, 18 inches of vegetative soil cover layer (supplied by Solutia's off-site soil borrow provider), cap system underdrains (both perforated and solid wall), and other incidentals associated with the low permeability cover.	Firm Lump Sum	
Item 15.0 - Permanent Permeable Cover – Preparation of cover area subgrade, installation of geotextile and 18 inches of vegetative soil cover layer (supplied by Solutia's off-site soil borrow provider), and other incidentals associated with the permanent permeable cover.	Firm Lump Sum	
Item 16.0 - Seeding and Mulching – Preparation of seedbed, application of lime, fertilizer, seed and mulch, and maintenance of seeded areas. Temporary seeding as required.	Firm Lump Sum	
Item 17.0 - Stone Surface Access Roads – Installation of geotextile, stone, and piping associated with the stone surfaced access roads traversing the caps and covers.	Firm Lump Sum	
Item 18.0 - WVABCA Soil Removal/Replacement – Excavation of soil, installation of geotextile, placement of clean soil cover, and recontouring area.	Firm Lump Sum	
Item 19.0 – Groundwater Pumping System – Installation of wet well structures, valve vaults, control panels, force main piping and cleanouts, groundwater pumping well polyethylene piping, electrical PVC conduit, and well concrete enclosures.	Firm Lump Sum	

Total Firm Lump Sum Bid

$_____

Figures

_____

Words

COST BREAKDOWN FOR BUDGET AND ACCOUNTING PURPOSES

Activity	Description	Estimated Quantities	Estimated Cost
1.0	Project Management	Lump Sum	
2.0	Health and Safety Administration	Lump Sum	
3.0	Support Facilities	Lump Sum	
4.0	Mobilization	Lump Sum	
5.0	Demobilization	Lump Sum	
6.0	Site Access	Lump Sum	
7.0	Dust Control	Lump Sum	
8.0	Riverbank Armoring	---	---
8.1	Clearing and Grubbing		
8.2	Unclassified Excavation		
8.3	Turbidity Control Curtain		
8.4	Geotextile		
8.5	Rock Riprap		
8.6	Gas Pipeline and Metering Station Relocation		
9.0	Stormwater Runoff and Water Management	---	---
9.1	Silt Fence		
9.2	Super Silt Fence		
9.3	Outlet 001 Sediment Basin		
9.4	Outlet 003 Sediment Basin		
9.5	Drop Inlet Protection		
9.6	Stabilized Construction Entrance		
10.0	Surface Runoff Control System	---	---
10.1	12-inch Corrugated Plastic Pipe		
10.2	18-inch Corrugated Plastic Pipe		
10.3	24-inch Corrugated Plastic Pipe		
10.4	30-inch Corrugated Plastic Pipe		
10.5	36-inch Corrugated Plastic Pipe		
10.6	Drop Inlets		
10.7	Drainage Channel		

Activity	Description	Estimated Quantities	Estimated Cost
10.8	Drainage Swale		
11.0	WVABCA Drainage Swale	---	---
11.1	Unclassified Excavation		
11.2	Placement of Clean Soil Cover from Off-site Borrow Source (soil supplied by Solutia's off-site soil borrow provider)		
11.3	Geotextile		
11.4	Erosion Control Matting		
11.5	Riprap		
12.0	Excavation and Fill to Achieve General Fill Layer Surface	---	---
12.1	Excavation for General Fill Layer		
12.2	Placement of Off-site Soil Borrow for General Fill Layer (soil supplied by Solutia's off-site soil borrow provider)		
13.0	Low Permeability Cap	---	---
13.1	Geotextile		
13.2	40-mil Smooth HDPE Geomembrane		
13.3	Drainage Composite		
13.4	18 Inches Vegetative Soil Cover Layer (soil supplied by Solutia's off-site soil borrow provider)		
13.5	Cap System Underdrains (Perforated)		
13.6	Cap System Underdrains (Solid Wall)		
14.0	Low Permeability Cover	---	---
14.1	40-mil Smooth HDPE Geomembrane		
14.2	Geotextile		
14.3	18 Inches Vegetative Soil Cover Layer (soil supplied by Solutia's off-site soil borrow provider)		
14.4	Cap System Underdrains (Perforated)		
14.5	Cap System Underdrains (Solid Wall)		
15.0	Permanent Permeable Cover	---	---
15.1	Geotextile		

Activity	Description	Estimated Quantities	Estimated Cost
15.2	18 Inches Vegetative Soil Cover Layer (soil supplied by Solutia's off-site soil borrow provider)		
16.0	Seeding and Mulching		
17.0	Stone Surfaced Access Roads		
18.0	WVABCA Soil Removal/Replacement	---	---
18.1	Excavation		
18.2	Geotextile		
18.3	Clean Soil Backfill (soil supplied by Solutia's off-site soil borrow provider)		
19.0	Groundwater Pumping System	---	---
19.1	Pump Station Wet Wells and Access Covers		
19.2	Pump Station Valve Vaults and Access Covers		
19.3	Pump Station Control Panels		
19.4	Force Main Cleanouts		
19.5	3-inch DR 11 PE 3608 Force Main Piping		
19.6	2-inch DR 11 PE 3608 Groundwater Pumping Well Piping		
19.7	Groundwater Pumping Well Enclosures and Access Covers		
19.8	1-inch Schedule 80 PVC Conduit to Groundwater Pumping Wells		
TOTAL CONSTRUCTION BREAKDOWN: (Total Should be Equal to Total Firm Lump Sum Bid)			

Estimated Amounts to be Invoiced per Year Based on Contractor's Proposed Schedule and Firm Lump Sum Bid:

Calendar Year 2012: $_____

Calendar Year 2013: $_____

Calendar Year 2014: $_____

TOTAL FIRM LUMP SUM BID: $_____

Proposed Subcontractor(s)

The Contractor proposes to use the Subcontractor(s) identified below for indicated tasks. No substitutions may be made without prior written approval from Solutia. (Use additional sheets as necessary.)

Subcontractor	General Work Activities

Addenda No.	Date	Acknowledged

Contractor Acknowledgment and Authorization of Cost Proposal

The Contractor acknowledges that it has examined this RFP and all related Project and Contract Documents and has attended the Pre-Bid Meeting and Site Visit. By signing this Cost Proposal Bid Form, the Contractor acknowledges that it and any Subcontractors are appropriately qualified and licensed to perform the Work, understand all of the conditions of Work, and waive all right to plead any misunderstanding regarding the same.

As stated above, the selected Contractor will be bound by all issued Addenda, whether or not acknowledged herein. In submitting the Cost Proposal Bid Form, the Contractor acknowledges and warrants that the cost proposal is for all of the Work described herein and the cost proposal entries cover and include full compensation, including all applicable local, state, and federal taxes to the Contractor for the performance of each obligation imposed by the Contract. The Contractor further acknowledges and agrees that the cost proposal entries provided herein are valid for the duration of the Work.

This Cost Proposal Bid Form executed this _____ day of _____, 2012.

_____ License No.:_____
Contractor

_____ Federal ID No.:_____
By

_____
Title

- END OF BID FORM -

3.0 CONDITIONS OF WORK

3.1 Regulatory Requirements

The execution of the Work shall comply with all federal, state, and local regulations and guidance. The Contractor shall be familiar with and adhere to all applicable regulations and shall be subject to requirements of such whether specifically addressed herein or not.

The Contractor will be obligated to meet the requirements of all applicable environmental permits (to be obtained by Solutia) and/or regulations.

Environmental permits and approvals which have been obtained by Solutia applicable to the Project include:

- License and right-of-entry to install riverbank armoring granted by the West Virginia Division of Natural Resources dated December 23, 2011.
- Department of the Army Section 404 Nationwide Permit (Nos. 33 and 38) covering riverbank armoring.
- 401 Water Quality Certification issued by West Virginia Department of Environmental Protection for riverbank armoring activities.
- National Pollutant Discharge Elimination System (NPDES) Permit No. WV0116181 Modification 2 issued by the West Virginia Department of Environmental Protection for stormwater discharges from the Site.
- Resource Conservation and Recovery Act (RCRA) work plan approval of the Final Caps and Covers Installation Work Plan (drawings and specifications).

The Contractor shall obtain (and provide copies to Solutia and Solutia's Engineer) all other construction (i.e., non-environmental) permits that may be required under local jurisdictions.

3.2 Pre-Construction Meeting, Regular Meetings

A Pre-Construction Meeting will be held following award of the Contract and prior to Contractor mobilization. Solutia will schedule this meeting after award of the Contract. The purpose of the Pre-Construction Meeting is to review Contract requirements; review/modify the Contractor's Draft Construction Schedule (Section 3.7); discuss the development of the Contractor's Health and Safety Plan; review project requirements; introduce various Project team members representing the Contractor, Solutia, and Solutia's Engineer; and resolve any questions raised by said parties.

In the preparation of a cost proposal, the Contractor should assume participation in continuous coordination efforts with all on-site parties. Informal meetings will be held at the Site. On-site representatives of the Contractor and Solutia will attend these meetings to discuss day-to-day

operations, schedule, health and safety items, outstanding issues, and the general status of the Project. Approximate weekly meetings will be held on-site among representatives of the Contractor, Solutia, and Solutia's Engineer. These meetings will be held to discuss issues including, but not limited to, Work status, schedule, scope of Work, and overall Project implementation issues.

3.3 Required Submittals

The Contract requires the submittal of various plans, documents, data, drawings, and other information related to the performance of construction activities. For those submittals required after Contract award (Operations Plan, schedule revisions/updates, HASP, material submittals, Record Drawings, etc.) and unless otherwise indicated, one copy of each item should be submitted to the following individuals:

Attention: Mr. Michael L. House
Solutia Inc.
Manager, Remedial Projects
575 Maryville Centre Drive
PO Box 66760
St. Louis, MO 63141
Telephone: 314-674-6717
Fax: 314-674-8957
Email: mlhous1@solutia.com

Six copies of each submittal should also be submitted to:

Attention: Mr. Michael Light
Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Telephone: 304-342-1400
Fax: 304-343-9031
Email: mlight@potesta.com

These submittals (with the exception of the Record Drawings) must be received prior to the Contractor's mobilization or seven days prior to the Contractor's intended use of the item/activity covered by the submittal, as appropriate. Solutia's Engineer will subsequently review the submittals to determine general compliance with the Contract requirements. Solutia's Engineer's review will not be a complete check of the detailed methods, materials, or procedures and shall not be construed as permitting any departure from the Contract, except where the Contractor has previously requested and received written approval from Solutia for such departure. The Contractor will not be permitted to undertake any activity that is directly or indirectly related to the item covered by the submittal until such time that Solutia provides notification to the Contractor.

Submitted data will be reviewed and processed by Solutia's Engineer as follows:

- "Reviewed" if no objections are observed or comments made.

- "Reviewed and Noted" if minor objections, comments, or additions are made but resubmittal is not considered necessary.

- "Resubmit" if the objections, comments, or additions are extensive, or if re-transmittal to another Contractor is required. In this case, the Contractor must resubmit the items after correction and the same number of copies must be included in the resubmittal as in the first submittal. The Contractor will not be permitted to perform any activity that directly or indirectly involves the item covered by the submittal until a "Reviewed" or "Reviewed and Noted" action or notification is provided by Solutia's Engineer.

- "Rejected" if the submittal under consideration is not, even with reasonable revision, acceptable, or when the data submitted are not sufficiently complete to establish compliance with the Contract requirements. In this case, the Contractor must resubmit a new or modified submittal that meets the scope and intent of the Work specified in the Contract. The Contractor will not be permitted to perform any activity that directly or indirectly involves the item covered by the submittal until a "Reviewed" or "Reviewed and Noted" action or notification is provided by Solutia's Engineer.

The following provides a list of the required submittals subject to the provisions of this section:

- All applicable non-environmental permits necessary to perform the Work specified in this RFP.

- Operations Plan.

- Proposed substitutions for materials or modifications to procedures specified in the Contract Documents in accordance with Section 3.4.

- Construction Schedule in accordance with Section 3.7.

- Record Drawings in accordance with Section 3.13.

- All sample and analytical results, including all laboratory deliverables.

- All other technical submittals required in Section 3 or by the Technical Specifications.

Solutia's Engineer has developed and will update a Technical Submittal Register (Appendix F), as necessary to reflect receipt of new submittals and/or changes in submittal(s) status.

3.4 Equivalent Procedures/Products

Unless directed otherwise, the Contractor may propose the use of substitute products and materials other than as specified in the Contract. The Contractor may also submit substitute procedures for performing operations other than as described in the Contract. All proposed substitute materials and procedures must be effectively equivalent to the materials and procedures specified in this Contract. In submitting "equivalent" products or procedures, the Contractor recognizes that it is responsible for all costs associated with furnishing, installing, or performing the "equivalent" product or procedure. This will include all costs for Solutia's Engineer to review, modify, or redesign the scope of Work to accommodate the "equivalent" product or procedure.

The submittal or use of an "equivalent" product or procedure will in no way impact the overall implementation schedule. Potential time delays associated with Solutia's Engineer to review the proposed substitute should be considered by the Contractor in submitting an "equivalent" product or procedure.

The Contractor may prepare its lump sum cost estimates using "equivalent" products or procedures in lieu of those specified within this Contract. However, the Contractor recognizes that this will be done at risk, as Solutia may deem the "equivalent" product(s) or procedure(s) as unacceptable. Solutia will incur no additional costs for the replacement of "equivalent" products or procedures with those originally specified.

Solutia will be the sole judge of acceptability and no substitute will be ordered, utilized, or installed without Solutia's prior written acceptance. Solutia may require the Contractor to furnish, at the Contractor's expense, a special performance guarantee or other surety with respect to any substitute.

3.5 Operations Plan

Prior to implementing Work activities, the Contractor shall submit an Operations Plan to Solutia for review and approval. This plan will be prepared in consultation with Solutia and shall address, but not be limited to, the following items:

- List/schedule of equipment to be used during construction.
- Property protection procedures (Sections 3.10 and 3.11).
- Construction Schedule (Section 3.7).
- Dust control methods.
- The Contractor's proposed plan for controlling vehicular and pedestrian traffic during the performance of construction activities.

- Stormwater erosion control procedures including inspections, maintenance, and repairs.

- Equipment cleaning procedures (Section 3.12 of the Conditions of Work).

- Measures to avoid impacting clean cap and cover layers from excavated material, dust, stormwater runoff, etc.

The purpose of the Operations Plan is to summarize the materials, procedures, and controls that the Contractor intends to utilize during construction activities. The Operations Plan should address all appropriate issues described in the Contract and should be of sufficient detail to allow planning and coordination by Solutia as may be required.

For the purpose of developing a bid, the Contractor should assume that the following parameters/activities will be required for preparation of an Operations Plan:

- Attendance at a pre-construction meeting in Nitro, West Virginia to discuss technical implementation issues and develop procedures to address such issues associated with the Project. The Contractor's proposed Site Supervisor, the Contractor's overall Project Manager, and the appropriate field personnel should be in attendance at the meeting.

- Within two weeks of the meeting, the Contractor must develop a draft Operations Plan for submittal to Solutia. Preparation of a second draft and final version of the Operations Plan should be assumed by the Contractor, as well as one or more conference calls to discuss the plan. Note that Solutia will review the plan and provide comments which must be addressed by the Contractor to the satisfaction of Solutia.

3.6 Dust Control and Stormwater Runoff Control

The Contractor shall implement procedures to prevent nuisance dust from Site construction and operations. This shall include monitoring and the use of dust suppressants such as sprinkling or spraying with water or other suitable materials. Solutia will conduct perimeter air monitoring along the Site boundary. Excessive particulates in these air samples and/or visible dust as determined by Solutia will be cause for the Contractor to change and upgrade dust control measures.

The Contractor shall implement best management practices to control erosion and sediments in stormwater runoff on the Site. The Drawings and Technical Specifications present the minimum requirements for stormwater runoff control. Solutia will operate the upgraded sediment basins by adjusting the stored water elevations and volumes in order to treat stormwater as effectively as possible. The Contractor shall conduct its operations and make adjustments as necessary to effectively treat and manage stormwater runoff in order to comply with Solutia's NPDES effluent limits.

3.7 Construction Schedule

As part of the Operations Plan (Section 3.5), the Contractor must submit a proposed Draft Construction Schedule to Solutia for review and approval. The Draft Construction Schedule should be neatly prepared and indicate all anticipated start and completion dates. Additional requirements are provided below:

- At a minimum, the following Work items should be included:
  - Mobilization
  - Site Preparation
  - Dust Control
  - Erosion and Sediment Controls, Stormwater Management BMP Installation including Outlet 001 and Outlet 003 Sediment Basins
  - Riverbank Armoring including clearing, grubbing, excavation, geotextile, stone, and gas line relocation
  - Surface Runoff Control System including corrugated plastic pipes, drop inlets, drainage channels, and drainage swales
  - WVABCA Drainage Swale Excavation and Soil Cover
  - Earthwork to Achieve General Fill Layer Surface
  - Low Permeability Cap including geotextile, 40-mil HDPE geomembrane, drainage composite, cap system underdrains, and 18-inch vegetative soil cover layer
  - Low Permeability Cover including 40-mil HDPE geomembrane, geotextile, cap system underdrains, and 18-inch vegetative soil cover layer
  - Permanent Permeable Cover including geotextile and 18-inch vegetative soil cover layer
  - Seeding and Mulching
  - Stone Surfaced Access Roads
  - WVABCA Soil Removal and Replacement
  - Groundwater Pumping System
  - Demobilization

- Show complete sequence of construction by activity, identifying Work of separate stages and areas (PA and WTA) and other logically grouped activities, including Work by Subcontractors. Indicate the early and late start, early and late finish, float dates, and duration; and

- Revise and resubmit construction progress schedules on a weekly basis.

In accordance with Solutia's General Conditions of the Construction Contract (Appendix B), Solutia anticipates that the Contractor will conduct Work activities during daylight hours, five days per week (Monday through Friday), except in cases of emergency or unless prior approval has been obtained from Solutia.

Failure to comply with these requirements may result in a Work stoppage, at the Contractor's expense, until such time that the requirements of this condition are met.

3.8 Provisions for Extra Work/Change Orders

During the course of performing this Contract, modifications may be identified that impact the amount of manpower, equipment, materials, or other subcontract services required. In this event, Solutia will prepare a Change Order. The Change Order will inform the Contractor of Contract modifications and request a cost adjustment in reference to the Contract Cost Proposal. If the cost adjustment is acceptable to and approved by Solutia, the Contractor shall proceed with implementing the Change Order. If the cost adjustment is not acceptable to Solutia, then the Work will be performed under force account.

Force account Work shall be measured and paid based on expended labor, equipment, and materials, plus an allowance for overhead and profit. At the end of each workday the Contractor and Solutia's Representative shall agree on total labor (Contractor and Subcontractor) and equipment hours utilized for the force account Work, as well as the quantity of all materials used. Agreement shall be indicated by signature of the Contractor and Solutia's Engineer on each day force account Work is being performed.

No payment will be made for Work performed on a force account basis until the Contractor has provided Solutia with statements of costs of such force account Work detailed as follows:

- Copies of daily forms from the Contractor summarizing total labor and equipment hours utilized for the force account Work, as well as the quantity of all materials used, signed by both the Contractor and Solutia's Engineer (an example form is provided in Appendix H).

- A summary of all labor, equipment, and material costs to perform the force account Work. This includes:

    - Name, labor classification, date, daily hours, total hours, hourly rate, and extension for each laborer and foreman (does not include superintendents or other labor classifications above a foreman). The hourly rates will be agreed upon by Solutia (based on the rates submitted by the Contractor, as discussed in Section 1.10 in this RFP) and will include all supplemental benefits, payroll taxes, insurance premiums, overtime, and other reasonable charges that are paid by the Contractor. The hourly rates should not include any profit or overhead markups (these are discussed below).

    - Equipment name, date, daily hours, total hours, rate (hourly, weekly, or monthly), and extension for each unit of self-owned construction equipment (does not include small hand tools). Based on the duration that the construction equipment was used, either the hourly, weekly, or monthly equipment rate will be used (based on the rates submitted by the Contractor,

as discussed in Section 1.10 in this RFP) and will include costs for fuel and maintenance. The hourly, weekly, and monthly equipment rates should not include any profit or overhead markups (these are discussed below). For rented equipment, a copy of the invoice for such equipment should be provided to Solutia and will be paid based on the rental cost incurred by the Contractor.

- Quantities of materials, prices, and extensions. Invoices should be included for all materials used, as well as any transportation charges that may be associated with delivering the materials to the Site.

- Total cost of Subcontractors used to perform force account activities. Include a copy of the invoice submitted to the Contractor from the Subcontractor.

3.9 Work Impacting Public Roadways

The use and protection of all public roadways involved in the Work must be performed by the Contractor in accordance with all applicable federal, state, county, and local requirements. The application and issuance of all necessary road and bridge crossing permits from the appropriate public agencies must precede all transportation of equipment and materials along public roadways. The Contractor will be responsible for all permits and associated fees. Repair and/or replacement of any damages to existing roadways or bridges will be the Contractor's responsibility.

The Contractor will provide and pay for all required and appropriate traffic warnings and controls for all points of equipment access to the Site. Such warnings and controls will include, but are not limited to, warning signs and the use of a flag person or police officer during all instances when heavy equipment enters or exits the Site. The use of such controls must be maintained for the duration of on-site activities.

The Contractor's proposed method for controlling vehicular/pedestrian traffic during construction activities at the Site should be included in the Operations Plan (Section 3.5 of the Conditions of Work).

None of the actual construction Work is proposed within public road right-of-ways.

3.10 Protection of Existing Structures and Utilities

The Contractor must not interfere with or cause damage to existing structures or utilities. The Contractor must notify appropriate utility companies (and/or any private organization that is authorized by the utility companies to delineate the presence of all subsurface services [e.g., Miss Utility of West Virginia]) before on-site activities are started. The Contractor must allow a sufficient amount of time following notification for performance of the delineation Work. The Contractor will provide the necessary utility contact information for Solutia to verify that such

notification has occurred prior to initiating construction activities. No Work shall be performed by the Contractor until all delineation Work has been completed.

Utilities must be protected in a manner prescribed by the utility company. Existing structures (e.g., utility poles, high tension towers, monitoring wells, etc.) or utilities that are damaged during the course of the Work must be immediately reported to the respective utility company (if applicable) and/or Solutia. Solutia will notify its representative regarding the situation. Appropriate repairs will be made at the expense (time, labor, materials, etc.) of the Contractor.

The Contractor is advised of the presence of a gas pipeline crossing portions of the PA and WTA property. Underground utilities and storm drains exist along the Interstate 64 right-of-way. Overhead electric also crosses through the property.

3.11 Protection of the Environment

During the performance of construction activities, the Contractor must take all necessary precautions to protect the environment. In doing so, the Contractor must protect all water courses, surface waters, groundwater, soils, and air from degradation or damage in accordance with all federal, state, and local laws and regulations.

The Contractor must utilize appropriate soil erosion and control measures, as shown on the Technical Drawings, Specifications and as approved in the NPDES permit. This will include, but not necessarily be limited to, placement and maintenance of silt fence, super silt fence, sediment basins, stabilized construction entrances, and/or other surface water BMPs at the locations identified on the Technical Drawings, around Work areas, and in additional areas as noted by the Contractor or requested by Solutia's Engineer during the course of construction activities. All erosion control measures must be inspected on a daily basis and after rainfall events to assure that maximum control is being provided. Following inspection, and as necessary, the erosion control measures should be modified, cleaned, reinforced, replaced, and/or maintained.

The Contractor must take adequate measures for keeping noise levels at safe and tolerable limits as set forth by OSHA, the EPA, State codes or ordinances, and/or any local requirements. All construction equipment presenting a potential noise nuisance must be provided with noise muffling devices.

The Contractor will make available to Solutia (on a timely basis) the results of all air monitoring conducted by the Contractor as any form of worker or Work area monitoring. The Contractor's proposed approach for air monitoring and dust control must be identified in its HASP.

3.12 Cleaning of Transportation Vehicles

During performance of the construction activities required in this RFP, the Contractor shall undertake every effort not to track mud or dust on any private/public roadways. However, should such material inadvertently impact private/public roadways, the Contractor is solely responsible for

the removal of all mud, dust, or other objectionable material that is tracked on public or private roadways throughout each workday.

This also applies to tracking contaminated soil and/or backfill materials outside of the Work areas on the Site. The tracking of soil and/or backfill materials onto the Site roadways or other areas outside of the Work areas will not be permitted.

3.13 Record Drawings

During implementation of the construction activities discussed herein, the Contractor must keep one set of the Technical Drawings at the Site on which the Contractor accurately shows all Work performed. All changes must be neatly and clearly marked on the record drawings using colored ink or pencil, and the entire set of record drawings must be kept current on a day-to-day basis in concert with the progress of the Work. Where applicable, the change marked on a Drawing is to carry the notation "per Change Order No. ___," or similar reference which cites the reason for the change. The day-to-day construction Record Drawings must be made available to Solutia or Solutia's Engineer for review upon request.

The following items are examples of some of the types of changes that could occur and are to be recorded on the Record Drawings by the Contractor.

- Change in location of Project components.
- Location of all underground utilities encountered as well as size, material of construction, etc.
- Modifications made to the final caps and covers or drainage control systems.
- Additions to the Project Work.
- Elimination of a Project Work component.
- Unforeseen modifications to existing structures made necessary by requirements of the Work.
- Site restoration modifications made at the request of Solutia.

Within two weeks of substantial completion of the construction activities at the Site, the Contractor must deliver one (1) complete, accurate, and legible set of Record Drawings for the Site, signed by a West Virginia-licensed land surveyor, to Solutia. Solutia retains the right to withhold a portion of payment to the Contractor if Record Drawings are not kept current in accordance with this section or if Record Drawings are not received within two weeks following substantial completion.

3.14 Coordination with Others

The Contractor shall recognize and accommodate the work of other contractors and activities performed by Solutia or Solutia's Engineer to facilitate timely implementation of the overall Project. Several conditions have been included in this Contract to facilitate coordination efforts. These include: identification of the sequence of construction activities (in the Operations Plan, Section 3.5); Construction Schedule (Section 3.7); a Pre-Construction Meeting (Section 3.2); and coordination with Solutia for the delivery and handling of off-site soil borrow delivered to the Site by Solutia's off-site soil borrow provider..

Given the above, the Contractor shall not view any portion of time expended waiting for further direction or coordination time with various contractors, Solutia or Solutia's Engineer as an interruption to Work, and shall not submit a claim for payment due to work interruptions caused thereby.

3.15 Engineer's Status

The Engineer (Potesta & Associates, Inc.) is Solutia's design engineer for the Project. The Engineer will observe the construction progress as required to ensure that the Contractor is properly implementing its design in the field. Engineer will have the authority to act only to the extent provided in the Contract. The Engineer will have no authority to authorize changes in Work schedule or Contract Price; only Solutia shall have such authority to act on behalf of Solutia.

The Engineer will not make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Engineer will not be responsible for the Contractor's construction means, methods, techniques, sequences and procedures or for Contractor's safety precautions and programs.

The Engineer's authority to act under the Contract, and any decision made by Engineer either to exercise or not to exercise such authority, shall not constitute any duty or responsibility of Engineer to Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors.

The Engineer will not be responsible for the errors, acts or omissions of Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors.

3.16 Warranty of Work

The Contractor will correct any materials and workmanship associated with the Project Work for a period of one year following the date of acceptance by Solutia of the completed work.

- END OF SECTION -

APPENDIX A

CONTRACT NO.____

CEA or PROJECT NO.____

THIS AGREEMENT is made as of _____, 2012, by and between Solutia Inc., 575 Maryville Centre Drive, St. Louis, Missouri 63141 ("Solutia"), a Delaware corporation, and [name] _____, [address] _____ ("Contractor"), a _____ [corporation/partnership].

WITNESSETH THAT:

WHEREAS, Solutia desires to have performed or constructed the services or facilities described in the Contract Documents (the "Work"), said Work to be a part of or associated with Solutia's Final Caps and Covers Installation (the "Project"] at Solutia's Nitro, West Virginia property, a former manufacturing plant located at 1 Monsanto Road, Nitro, West Virginia 25143 (the "Site"); and

WHEREAS, Contractor represents it has the necessary personnel, experience, competence and legal right to perform the Work;

NOW, THEREFORE, Contractor and Solutia, for the consideration hereinafter set forth, agree as follows:

ARTICLE 1. SCOPE - CONTRACT DOCUMENTS

a. Except as otherwise specifically set forth in the Contract Documents (as hereinafter defined), Contractor shall furnish all labor, supervision, equipment, materials, services and all other things necessary for the proper performance of the Work in strict accordance with the Scope of Work, specifications ("Specifications"), and the drawings ("Drawings") identified by the Request for Proposal dated February 11, 2012, and all other Contract Documents (as hereinafter defined).

b. The "Contract Documents" consist of this Agreement and the Schedules attached hereto including Schedule A, Contractor's Rate Schedule, the General Conditions, the Drawings and the Specifications, any addenda to the Drawings and Specifications, and all written modifications made pursuant to the terms of this Agreement. Said Contract Documents form the "Contract." The Drawings and the Specifications are as fully a part of the Contract as if hereto attached.

ARTICLE 2. COMPLETION

a. Contractor agrees that the Work shall be commenced at the Site on or before _____ and shall be completed on or before December 31, 2014.

b. Contractor agrees that the period of time set forth above in paragraph 2.a. is sufficient to permit completion of the Work.

ARTICLE 3. CONTRACT PRICE - PARTIAL PAYMENTS - CHANGES

a. In full payment for Contractor's entire performance of the Contract, Solutia shall pay Contractor the contract price of _____ ("Contract Price).

b. Within ten days after commencing the Work, Contractor shall submit to the employee of Solutia authorized to represent it with respect to the Work (the "Solutia Representative") a schedule of values for the various categories of the Work aggregating the Contract Price, with a word description of and dollar amount for each category (the "Schedule of Values)". The Schedule of Values shall be subject to the approval of the Solutia Representative and shall be the basis for Solutia's Representative's estimates of labor, equipment and material incorporated into the Work and of equipment and material suitably stored at the Site for the purpose of progress payments to Contractor.

c. An application for payment shall be submitted to the Solutia Representative by Contractor at such regular intervals (no more often than monthly) as may be decided by mutual agreement. The application shall be itemized in accordance with the Schedule of Values submitted by Contractor pursuant to paragraph 3.b. hereof; said application shall list the percent completion of the Work, the total billing to date, the total previously billed, the total retention to date and the amount covered for each category of the Work, and shall be supported by such evidence as the Solutia Representative may direct, including evidence satisfactory to the Solutia Representative that all payrolls, materials bills, taxes and other indebtedness connected with the Work to date have been paid. The Solutia Representative shall check the application for payment and, not later than five (5) working days after receipt of such application, shall approve and forward for payment by Solutia of a sum equal to ninety percent (90%) of the value of labor, equipment and/or material which the Solutia Representative estimates has been acceptably incorporated into the Work or suitably stored at the Site, less the aggregate of any previous payments. Payment shall be made within sixty (60) days after Solutia Representative's approval of Contractor's application for payment.

d. In the event that changes in the Work involving additional costs to Contractor are ordered by Solutia pursuant to the "Changes in the Work" Article of the General Conditions, Contractor's total compensation for performing such changes in the Work shall be either lump sum or a time and materials basis computed in accordance with the Contractor's Rates set forth in Schedule __ attached hereto.

ARTICLE 4. ACKNOWLEDGMENTS OF CONTRACTOR

Contractor acknowledges that it has had an opportunity to visit the Site; that it has become generally familiar with local conditions under which the Work is to be performed; that it has carefully examined all of the Contract Documents prior to the submission of its bid and/or execution of the Contract; and that there are no omissions, ambiguities, or conflicts in the Contract Documents which have not

already been clarified in writing by Solutia. Accordingly, Contractor agrees that it shall hereafter have no claim for additional compensation or extension of time of performance, unless such claim is based upon conditions at the Site, or omissions, ambiguities or conflicts in the Contract Documents, which Contractor can show that it could not have discovered in the exercise of reasonable care prior to submission of its bid and/or execution of the Contract.

ARTICLE 5. NOTICES

Except as otherwise specifically provided, any notice required or permitted to be given under this Agreement shall be in writing and (i) delivered in person, which delivery the recipient agrees to acknowledge in writing; (ii) transmitted by facsimile with a confirming copy delivered on the next business day by a nationally recognized overnight courier service; (iii) deposited in the United States postal service mail (or, if outside the United States, such other country's postal service mail) postage fee prepaid, for mailing by first-class, registered or certified mail; or (iv) sent by a nationally recognized overnight courier service, addressed as follows:

i. If to Solutia:

Solutia Inc.
575 Maryville Centre Drive
St. Louis, MO 63141
Attention: Michael House
Title: Manager, Remedial Projects
Facsimile:

ii. If to Contractor:

_____
_____
_____
Title: _____
Facsimile: _____

or to such other address or employee of either party as may be specified from time to time in a written notice given by that party. Both parties agree to acknowledge in writing the receipt of any notice delivered in person.

IN WITNESS WHEREOF, Contractor and Solutia have executed this Agreement effective as of the date set forth above.

SOLUTIA INC.

By: _____
Type Name: _____
Title: _____

_____

By: _____
Type Name: _____
Title: _____

APPENDIX B

GENERAL CONDITIONS

OF THE

CONTRACT

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1. DEFINITIONS

a. The term "Solutia Representative" means the employee of Solutia authorized to represent it on the Work.

b. The term "Solutia" means Solutia Inc., a Delaware corporation.

c. The term "Solutia Engineer" means Potesta & Associates, Inc. The Solutia Representative may delegate certain tasks hereunder to the Solutia Engineer; however, the Solutia Engineer has no authority to authorize any changes that result in an increase in the Contract Price or the Project Schedule. Only the Solutia Representative has authority to increase the Contract Price or extend the Contract Schedule.

d. Unless otherwise expressly stated in the Contract, any authorization, approval, or acceptance of Solutia or the Solutia Representative required under the Contract must be in writing and signed by the Solutia Representative.

e. Unless otherwise specifically set forth in the Contract, the term "Work" includes all operations, supervision, labor, equipment, materials and all things (including, but not limited to, all items, tools, supplies, articles, appurtenances, apparatus, machinery, appliances, scaffolding, utilities, services, sanitary facilities, supervision, transportation, incidentals and expenses) necessary for the proper performance of the services or construction of the facilities outlined in the Contract, whether they be described, listed, mentioned or scheduled in the Contract Documents or any subsequent modifications thereof.

f. The term "Project" is all of the services and construction of facilities required for the completion of the Project described in the Contract. The Work may be all or a portion of the Project and the Project may consist of work by Solutia or by other contractors.

g. The term "Subcontractor" means those individuals (other than employees of Contractor), firms or corporations having a direct contract with Contractor to perform any of the Work.

h. Whenever in the Contract the words "or equal," "similar and equal" or words or phrases of like import are used in conjunction with the brand or trade name of any proprietary item of equipment or materials, such words shall mean that the brand- or trade-named item will be used as a basis of comparison and that all makes of purported similar or equal items will be considered so long as they have equal or better qualities in the opinion of the Solutia Representative, whose decision shall be final and conclusive.

i. Whenever in the Contract the words "furnish," "install," "provide" or words of similar import are used, they shall mean, unless otherwise expressly stated in the Contract, that Contractor shall fabricate, complete, deliver, furnish, erect and install the item and shall include all operations, labor, equipment, materials, and all things (including all items, tools, supplies, articles, appurtenances, apparatus, machinery, appliances, scaffolding, utilities, services, sanitary facilities, supervision, transportation, incidentals and expenses)

necessary to complete the item in place, ready for operation or use, under the terms, conditions and provisions of the Contract.

j. Whenever in the Contract the words "as shown," "as indicated," "as detailed," "as noted" or words or phrases of similar import are used, they shall be understood to refer to the Drawings and Specifications.

k. Whenever in the Contract the words "as ordered," "as directed," "as required," "as permitted," "as allowed," "as approved" or words or phrases of similar import are used, they shall mean that the order, direction, requirement, permission, allowance or approval of the Solutia Representative is intended.

l. Whenever in the Contract the word "or" is used, it shall be interpreted to mean "and/or" unless a contrary meaning is clearly intended from the context.

m. Whenever in the Contract the word "architect," "owner," or any word of similar import appears, such word shall be deemed to mean the Solutia Representative or Solutia.

n. The term "Purchase Order" means a separate document entitled "Purchase Order" issued by Solutia to Contractor pursuant to the Contract and authorizing certain Work as described in such Purchase Order. The standard terms and conditions on the reverse side of said Purchase Order, and on any acknowledgement or confirmation thereof, shall be void and of no effect and all Work shall be pursuant to the terms and conditions of the Contract.

o. The term "Change Order" means a separate document entitled "Change Order" issued by Solutia to Contractor pursuant to Section 23 of these General Conditions of the Contract.

p. The term "Site" shall mean the Solutia Plant or other location of the Work identified in the Agreement.

2. INDEMNITY

a. Except as set forth in Section 2c of these General Conditions, to the fullest extent permitted by law, Contractor agrees to indemnify and save Solutia, its directors, officers and its employees harmless against any and all liabilities, penalties, demands, claims, causes of action, suits, losses, damages, costs and expenses (including cost of defense, amounts paid in settlement and reasonable attorneys' fees) which any or all of them may hereafter suffer, incur, be responsible for or pay out (whether the same arise out of or in connection with the Work, or from any operations under or in connection with the Contract) as a result of bodily injury (including death) to any person or damage (including loss of use) to any property occurring to, or caused in whole or in part by, the negligent acts, negligent omissions or willful misconduct of Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors, including those injuries and property damages caused by the joint or concurring negligent act or omission of Solutia or its employees, but only to the extent of Contractor's negligent acts, negligent omissions or willful misconduct. In claims against

any person or entity indemnified under this Section 2a by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation hereunder shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefits or other employee benefit acts. Upon the request of Solutia, Contractor shall promptly defend any such demand, claim, cause of action or suit.

b. Except as set forth in Section 2c of these General Conditions, Contractor agrees to make full reimbursement for any damage, including loss of use, to existing property or property being installed which may arise out of or in connection with the Work or from operations under or in connection with the Contract, to the extent caused, in whole or in part, by the negligent acts, negligent omissions or willful misconduct of Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors.

c. Solutia agrees that Contractor shall not be liable to Solutia for liabilities, penalties, demands, claims, causes of action, suits, losses, damages, costs and expenses arising out of bodily injury (including death) to any person or damage (including loss of use) to any property caused by or resulting from the sole negligence of Solutia, its directors, officers or employees.

3. INSURANCE REQUIREMENTS

a. Contractor shall take out and maintain during the term of this Contract at its own cost and expense at least the following insurance and such other types and additional limits of insurance as may be required by law:

	COVERAGE	LIMITS
i)	Workers' Compensation	Statutory
ii)	Employer's Liability	$1,000,000 each accident $1,000,000 disease-each employee $1,000,000 disease - policy limit
iii)	Commercial General Liability (Bodily Injury, Property Damage, Products and Completed Operations and contractual liability on an occurrence form of policy naming Solutia and lessees at Sites where the Work is performed as additional insureds)	$2,000,000 each occurrence, combined single limit

iv)	Comprehensive or Commercial Automobile Liability (Bodily Injury or Property Damage including coverage for all owned, non-owned and hired vehicles naming Solutia and lessees at Sites where the Work is performed as additional insureds)	$1,000,000 each occurrence, combined single limit
v)	Umbrella Liability Insurance affording excess coverage over the underlying primary insurance required by subsections ii), iii) and iv) hereof, and naming Solutia and lessees at Sites where the Work is performed as additional insureds	$10,000,000 each occurrence and annual aggregate
vi)	Contractor's Pollution Liability	$1,000,000 each occurrence and annual aggregate

b. To the extent permitted by the law of the state in which the Work is performed, Contractor shall secure from the company carrying the Workers' Compensation Insurance and Employer's Liability coverage above a waiver of subrogation in favor of Solutia, its employees and agents, and Solutia's lessees at the Site where the Work is performed, and the required certificate of insurance shall indicate such waiver of subrogation. Contractor's Workers' Compensation and Employer's Liability coverage shall be endorsed to include United States Longshoremen's and Harbor Worker's Act and Maritime (Jones Act) coverage for work involving navigable waters.

c. The insurance required herein shall be primary to any other valid and collectible insurance.

d. Prior to performance of any of the Work under this Contract, Contractor shall obtain and furnish to Solutia (or its designee, as Solutia may advise in writing) certificates of insurance evidencing the coverages required herein and stating that no reduction, cancellation or expiration of such insurance coverage shall become effective until thirty (30) days from the date written notice thereof is mailed to Solutia. Additionally, during the term of this Contract, Contractor shall provide further certificates (or a binder together with proof of payment of premium) to Solutia at least thirty (30) days prior to expiration dates shown on certificates pursuant to this subsection evidencing that the insurance required herein is in effect after said dates.

4. CORRELATION OF DOCUMENTS; INTENT

a. The Contract Documents are complementary and what is called for by any one Contract Document is as binding as if called for by all. There are certain operations, labor, supervision, equipment, materials, services and other things reasonably inferable from the Drawings, Specifications and other Contract Documents as being necessary to produce the intended results; even though no mention thereof is made in said Contract Documents, such omission shall not relieve Contractor from its obligation to provide all such operations, labor, supervision, equipment, materials, services and other things. Parts of the Work described in words which, when applied, have a well-known technical or trade meaning shall be furnished or performed in accordance with the recognized standards applicable to such meaning.

b. Before commencing a portion of the Work, in order to facilitate the Contractor's Work and not as an obligation to discover errors, omissions or inconsistencies in the Contract Documents, Contractor shall carefully study and compare the Contract Documents related to, take field measurements of any existing conditions related to, and observe any conditions at the Site affecting, such Work. Any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Solutia Representative prior to commencing such Work and Contractor shall request information or clarification from the Solutia Representative.

c. The Work shall be executed in strict accordance with the Contract Documents and no deviations from the requirements thereof shall be made without prior approval of the Solutia Representative.

d. Contractor assumes full responsibility for having familiarized itself with the nature and extent of the Contract Documents, the Work (including the site thereof), the Site, and local conditions that may in any way affect its performance under the Contract.

e. No attempt has been made in the Specifications to segregate Work to be performed by any trade subcontract or portion of the Project under any one Specification. To provide convenience of reference and to facilitate the letting of subcontracts, the Specifications may be separated into sections. Such separation, if any, shall not operate to make the Solutia Representative or Solutia the arbiter in establishing the limits of subcontract obligations between Contractor and its Subcontractors, nor to relieve the Contractor of any of its obligations under the Contract. Any segregation between trade or craft jurisdiction limits, and the establishment of subcontract limits, will be solely a matter of agreement between Contractor and its Subcontractors.

5. COPIES OF DOCUMENTS; ADDITIONAL INSTRUCTIONS

a. Unless otherwise provided in the Contract, Solutia will, subject to the terms, conditions and provisions of the Contract, furnish free of charge to Contractor one reproducible or electronic set of Drawings, set of details and set of Specifications. Upon Contractor's request sufficiently in advance of the need, Solutia shall furnish with reasonable promptness such additional instructions, by means of Drawings or otherwise, as

are necessary for the proper performance of the Work. Such instructions shall be consistent with and reasonably inferable from the Contract Documents.

b. Contractor shall do no Work without proper Specifications, Drawings or instructions and all Work shall be executed in conformity therewith.

c. If the Contract Documents appear to call for things which make it impossible to perform the Work in a first-class manner, if ambiguities or conflicts appear in the Specifications or Drawings, or if detailed information has been omitted, Contractor shall request interpretation, clarification and/or additional instructions before proceeding with the Work. If Contractor fails to make such request, no excuse will be entertained for failure to carry out all Work in a satisfactory manner. Should conflicts occur in or between the Contract Documents, causing an increase in Contractor's cost of performing the Work, Contractor shall be deemed to have estimated on the more expensive way of performing the Work, unless before executing the Contract, Contractor shall have asked for and obtained a written decision with respect thereto.

6. WORKING SCHEDULE; OVERTIME; RESTORATION OF APPROVED SCHEDULE

a. Unless otherwise set forth in the Contract Documents, within two weeks of notice to proceed with the Work, Contractor shall submit a proposed schedule for the Work to the Solutia Representative. The schedule shall not exceed the time limits set forth for completion in the Contract Documents. The schedule shall be subject to the approval of the Solutia Representative and shall show the dates of commencement and completion of each subdivision of the Work. Any necessary revisions of this schedule will be arranged by mutual agreement of the Solutia Representative and Contractor.

b. Contractor shall update the schedule at least weekly (or more often if required in the Contract Documents).

c. Unless otherwise set forth in the Contract Documents, it is intended that Contractor perform the Work on the basis of the standard work week for the area where the Site is located. Contractor shall perform scheduled overtime in connection with the Work only at the written request, or with the prior written approval of the Solutia Representative. When overtime is requested by Solutia under a lump-sum type contract (or when the Work involved is on a maximum cost or unit-price basis), Solutia will be liable beyond the Contract Price (or Not-To-Exceed Cost or unit price, as the case may be) only for the premium time over and above straight time, plus the additional payroll burden applicable to such premium time; provided, however, that Solutia shall not be liable if such overtime is caused or necessitated by some failure of Contractor to fulfill any obligation under the Contract including maintaining the schedule agreed to by the Parties (unless based on premium time Work) or if Contractor has failed to obtain prior written consent of the Solutia Representative to work such overtime. Mere assent by Solutia to the scheduling of overtime by Contractor shall not be construed as a request to schedule.

d. Whenever it becomes apparent from the latest schedule update or otherwise that any completion date for the Work or portion of the Work on the schedule approved by Solutia may not be met, Contractor shall, within forty-eight hours after receiving written notice from Solutia to restore the approved schedule, develop and submit to Solutia for approval a plan to restore the schedule which requires some or all of the following actions:

i) Increase construction manpower in such quantities as will eliminate the backlog of Work and put the Work back on the approved schedule.

ii) Increase the number of working hours per shift, shifts per working day, working days per week or the amount of construction equipment, or any combination of the aforesaid, which will substantially eliminate the backlog of Work and put the Work back on the approved schedule.

iii) Reschedule activities to achieve maximum practical occurrences of accomplishment of activities and put the Work back on the approved schedule.

Upon approval of such plan by Solutia, Contractor shall implement the plan. Costs of premium time over straight time shall not be reimbursable for such Work required due to Contractor's failure to meet the approved schedule. If Contractor fails to take any of the above actions within forty-eight hours after approval of the plan, Solutia may, but shall not be obligated, to take action to attempt to put the Work back on the approved schedule and deduct the cost of such actions from the Contract Sum or Not-To-Exceed Cost.

7. DRAWINGS AND SPECIFICATIONS

a. Contractor shall keep in good order and available to the Solutia Representative at the site of the Work current sets of all Drawings and Specifications.

b. All Drawings (including sketches, shop drawings and setting drawings) and Specifications, including all copies thereof, in whatever form including electronic form, furnished to Contractor, or obtained or prepared by Contractor for the Work, shall be delivered to Solutia when no longer required for performance of the Work or when requested by Solutia, but in any event upon completion of the Work; except that one copy of each may be retained by Contractor with the permission of Solutia All such Drawings and Specifications shall be the property of Solutia at all times and shall not be used for any other work by Contractor, nor shall Contractor permit such use by others. Contractor shall execute receipts, in a form acceptable to and at any time requested by Solutia, for all such Drawings and Specifications in its possession.

8. CONFIDENTIAL INFORMATION

a. Inasmuch as in performing the Work hereunder Contractor will acquire secret and confidential information and data concerning the business and operations of, or belonging to Solutia and/or other companies with whom Solutia has a business relationship, and additional information and data will be made available to Contractor or be developed by Contractor, Contractor agrees to treat all such information and data ("Solutia Information") as Solutia's confidential property and not to divulge it to others at any time

or to use it for Contractor's private purposes or otherwise except in behalf of Solutia without the prior written consent of Solutia unless and until such Solutia Information becomes a part of the public domain (other than by acts or omissions of Contractor, its employees, agents or contractors) or Contractor legally acquires such Solutia Information, without restriction on disclosure, from sources other than Solutia or other companies with whom Solutia has a business relationship. At Solutia's request, Contractor agrees to cause any of Contractor's employees involved in Work on Contractor's behalf to sign individual secrecy agreements in a form satisfactory to Solutia. This obligation on Contractor's part to keep such Solutia Information and data confidential shall continue beyond and after the period of Work hereunder, and at the completion or termination of the Work hereunder or at any time Solutia so requests, Contractor will deliver to Solutia all notes, memoranda, records, drawings, sketches or other documents (including all copies, reproductions, and excerpts thereof) containing Solutia Information and data Contractor has had access to, or has developed or compiled due to Contractor's Work hereunder.

b. Contractor shall not publish, publicize, advertise or otherwise divulge information with respect to the Work or the existence of this Contract without the prior written consent of Solutia.

c. Contractor and Solutia agree that all Work created or prepared pursuant to this Contract shall become the exclusive property of Solutia upon its creation. Further, in entering into this Contract with Solutia, Contractor agrees that all property rights, including all intellectual property rights, and the copyright in and to all works created pursuant to this Contract which are subject to U.S. copyright protection, including, but not limited to, original computer programs, software and enhancements, graphics, engineering plans, blueprints and drawings, advertising copy, sculpture, architecture, buildings, drawings, transparencies, audio, visual or audio/visual tapes, photographs, etc., shall be the exclusive property of Solutia immediately upon their creation. By entering into this Contract, Contractor warrants that all original work which is subject to U.S. copyright protection will be created by Contractor or Contractor's employee(s) and not by independent contractors. Contractor further warrants that all such original work is considered to be, at the time of creation, a **WORK MADE FOR HIRE** as defined in §101 (1) of the 1976 Copyright Act. Contractor agrees that all such original work will be assigned to Solutia without further compensation on a form provided at the time of completion or at any time when so requested by Solutia so that the Solutia may register the copyright in its name.

9. INTELLECTUAL PROPERTY RIGHTS

Although it is not anticipated that Contractor's provision of the Work hereunder shall result in the conception and/or making of inventions and discoveries, nevertheless it is understood and Contractor agrees, that any and all inventions and discoveries, whether or not patentable, which Contractor conceives and/or makes (1) within the term of this Contract and any extension mutually agreed upon and which are related to the Work under this Contract, and/or (2) as a result of confidential information received from Solutia, shall be the sole and exclusive property of Solutia, and that Contractor will, upon

request by Solutia, promptly execute any and all applications, assignments or other instruments which Solutia shall deem necessary or useful in order to apply for and obtain Letters Patent in the United States and all foreign countries for said inventions and discoveries and in order to assign and convey to Solutia the sole and exclusive right, title and interest in and to said inventions, discoveries, patent applications and patents thereon. It is understood that Solutia will bear the cost of preparation of all such patent applications and assignments, the cost of prosecution of all such patent applications in the United States Patent Office and in the patent offices of foreign countries.

10. INTELLECTUAL PROPERTY INDEMNITY

Contractor shall indemnify, defend and hold Solutia harmless from any and all losses, liabilities, damages, costs and expenses, including attorneys' fees, resulting from any claims, actions and proceedings alleging infringement or violation of any patent, copyright, trademark, trade name, trade secret or other intellectual property right of a third party and arising out of or resulting from the Work. The provisions of this paragraph shall not apply to the extent such claims or actions result from Contractor following specific written instructions or using written information given to Contractor by Solutia in accordance with this Contract; provided however, that Contractor shall promptly notify Solutia if it is aware that any such instructions or information supplied by Solutia infringe or are likely to infringe any patent, copyright, trademark, trade secret or other proprietary rights of a third party, and Contractor shall indemnify and defend Solutia from any losses and liabilities resulting from a failure to so notify Solutia.

11. SHOP AND SETTING DRAWINGS; REVIEW AND APPROVAL

a. Contractor shall prepare and keep current a schedule of shop and setting Drawings and schedule submittals which is coordinated with the approved construction schedule and allows reasonable time for Solutia's review of such submittals. Contractor shall check and verify all field measurements and field construction criteria related thereto and had checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. Contractor shall submit, with such promptness as to cause no delay in the Work or in the work of any other contractor, three (3) copies (or such additional copies if more copies are required in the Specifications or other Contract Documents), checked and approved by Contractor, of all shop or setting drawings and schedules required for the Work. Such drawings and schedules shall be complete and detailed. The Solutia Representative shall review them with reasonable promptness, making desired corrections; Contractor shall make all corrections required by the Solutia Representative, file with Solutia Representative two (2) corrected copies and furnish such other copies as may be needed. If Contractor considers any correction indicated on such drawings and schedules to constitute a change to the Drawings or Specifications, written notice as required under Section 23, CHANGES IN WORK, hereof shall be given to the Solutia Representative.

b. The Solutia Representative's review and/or approval of such drawings or schedules submittals shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings or

schedules submittals will not relieve Contractor of the responsibility for any error or deviation from the requirements of the Contract Documents which may exist as Contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory performance of the Work.

c. Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of shop drawings, product data, samples or other submittals until the respective submittal has been approved by the Solutia Representative.

12. SUBCONTRACTS

a. Contractor shall sublet to Subcontractors accepted by Solutia all portions of the Work that Contractor's organization has not been accustomed to performing, that Solutia may specify and that Solutia and Contractor may agree upon. Solutia reserves the right to review and approve all subcontracts as to scope of the Work to be performed and elements of cost. Such acceptance, review or approval or the failure to accept, review, or approve shall not be construed as relieving Contractor of any responsibility under the Contract.

b. Contractor shall have full directing authority over and responsibility for the performance of all portions of the Work it sublets and shall not be relieved of its full responsibility for the proper performance and completion of the Work because of such subletting.

c. As soon as practicable, and before making a commitment to any Subcontractor, Contractor shall notify the Solutia Representative in writing of the names of the Subcontractors proposed for all parts of the Work and Contractor shall not employ any Subcontractor concerning whom the Solutia Representative has an objection or whom cannot meet Solutia's prequalification requirements.

d. If, before or after the execution of the Contract, Contractor has submitted a list of proposed Subcontractors which have been accepted by the Solutia Representative and the change of any Subcontractor on such list is requested by Solutia after such acceptance, any contract price, Not-To-Exceed or maximum cost or unit price involved shall be increased or decreased by the difference in cost reasonably occasioned by such change.

e. The Solutia Representative may furnish to any Subcontractor evidence of the amounts paid or approved for payment to Contractor on account of the Subcontractor's work.

f. Nothing contained in the Contract is intended to nor shall the same create any contractual relation between any Subcontractor and Solutia or any obligation on the part of Solutia to pay or see to the payment of any moneys due any Subcontractor.

13. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

a. Contractor agrees to bind every Subcontractor by the terms, conditions and provisions of the Contract applicable to Subcontractor's work, unless otherwise specifically agreed to in writing by Solutia

b. Contractor further agrees to be bound to the Subcontractor by all the obligations applicable to the Subcontractor's work that Solutia assumes to Contractor under the Contract and by all the terms, conditions and provisions thereof affording remedies and redress to Contractor from Solutia.

c. Each subcontract agreement for a portion of the Work is assigned by the Contractor to Solutia; provided that such assignment is effective only after termination of the Contract by Solutia and only for those subcontracts that Solutia accepts by written notice to the Subcontractor and the Contractor.

14. SEPARATE CONTRACTS

a. Contractor agrees to cooperate fully with all other contractors and suppliers and to conform to all directions of the Solutia Representative regarding the progress of the Work. Contractor shall afford such other contractors and suppliers reasonable opportunity for the delivery and storage of their equipment and materials and the execution of their work and shall properly connect and coordinate the Work with theirs.

b. If any part of the Work depends upon the work of another contractor or of Solutia for proper execution or results, Contractor shall inspect said work and promptly inform the Solutia Representative of any defects that render it unsuitable or of any discrepancies between it and the requirements of the Contract. Contractor's failure to report such defects or discrepancies shall constitute an acceptance by Contractor of the work of such other contractor or of Solutia and an acknowledgment that the same is fit, suitable and proper for the reception of the Work, except as to defects which develop in the other work after the performance of the Work.

15. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should Contractor cause damage to any separate contractor or the work of such contractor, Contractor agrees, upon due notice, to settle with such contractor by agreement or arbitration, if the separate contractor will so settle. If such separate contractor institutes any action against Solutia on account of any such damage alleged to have been sustained, Solutia shall notify Contractor who shall promptly defend such proceedings, if and to the extent Solutia so requests. If any judgment against Solutia arises therefrom, Contractor shall, at Solutia's election, pay or satisfy it and reimburse Solutia for all costs and expenses incurred on account of such proceedings.

16. SOLUTIA REPRESENTATIVE'S STATUS

a. The Solutia Representative will be Solutia's authorized representative during construction and until final acceptance of the Work. The Solutia Representative will provide general administration of the Contract and will have authority to act on behalf of Solutia to the extent provided in the Contract. The Solutia Representative may delegate certain tasks to the Solutia Engineer but in no event may the Solutia Engineer authorize any increase in the Contract Price or an extension of the Project Schedule and Contractor acknowledges that if the Contractor proceeds without obtaining the written authorization of the Solutia Representative, it does so at its own risk.

b. The Solutia Representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Neither the Solutia Representative nor Solutia will be responsible for the Contractor's construction means, methods, techniques, sequences and procedures or for Contractor's safety precautions and programs.

c. Neither the Solutia Representative's authority to act under the Contract, nor any decision made by the Solutia Representative either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Solutia Representative to Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors.

d. The Solutia Representative will not be responsible for the errors, acts or omissions of Contractor (or any of its employees), any of its Subcontractors (or any employee thereof), or any person, firm or corporation (or any employee thereof) directly or indirectly employed or engaged by either Contractor or any of its Subcontractors.

17. SURVEYS; CONCEALED DEVICES; PERMITS; TAXES; LAW

a. A base line and grade datum will be furnished to Contractor. Contractor shall locate and lay out the construction in accordance with the Drawings and other Contract Documents, if applicable; field establish and maintain grades, lines, levels and locations required; and be responsible for the accuracy of the Work. Contractor shall, at its earliest opportunity but in any event prior to commencement of any construction, verify grades, lines, levels, locations and dimensions shown on the Drawings or other Contract Documents and report any errors or inconsistencies to the Solutia Representative. Contractor shall furnish all surveys unless otherwise specified in the Contract Documents.

b. Contractor shall physically verify the locations of any subterranean or otherwise concealed devices shown on the Drawings or mentioned in the Specifications or other Contract Documents before commencing any portion of the Work which might endanger same. Contractor shall pay all costs, expenses and fees for damage to any such concealed devices shown on the Drawings or mentioned in the Specifications or other Contract Documents or of which Contractor has knowledge, or to any sidewalks, streets or other visible public or private property, and shall repair or replace all of such concealed devices and visible property at its expense. Contractor shall, upon request of Solutia and as an addition to the Work authorized by a Change Order, repair or replace any damaged concealed devices not shown on the Drawings or mentioned in the Specifications or not discoverable by Contractor in the exercise of ordinary care.

c. Permits (except Building Permits unless specifically provided for in the Contract), governmental fees, licenses and any inspections necessary for the proper execution, completion and occupancy of the Work shall be secured and paid for by Contractor.

d. Unless otherwise specified, Contractor shall give all required legal notices.

e. Contractor shall comply with all federal, state, and local statutes, laws, ordinances, regulations, rules and codes bearing on the conduct of the Work. These include, but are not limited to, Occupational Safety and Health Act, Toxic Substances Control Act, Fair Labor Standards Act, the Food Drug and Cosmetic Act, Section 503 of the Rehabilitation Act of 1973, as amended, and 38 USC 4212 (formerly 2012) of the Vietnam Era Veterans Readjustment Assistance Act of 1974, as amended, as well as all regulations and requirements issued under the Department of Labor and the Environmental Protection Agency and the requirements of Executive Order 11246, as amended.

f. BY EXECUTION OF THIS AGREEMENT CONTRACTOR, ON BEHALF OF ITSELF AND ITS SUBCONTRACTORS, CERTIFIES THAT THEY DO NOT HAVE AND WILL NOT MAINTAIN ANY FACILITIES THEY PROVIDE FOR THEIR EMPLOYEES IN A SEGREGATED MANNER, NOR PERMIT THEIR EMPLOYEES TO PERFORM ANY WORK AT ANY LOCATION UNDER THEIR CONTROL, WHERE SEGREGATED FACILITIES ARE MAINTAINED.

g. Contractor shall indemnify and save Solutia harmless against any and all liabilities, penalties, demands, claims, causes of action, suits, losses, damages, costs and expenses which Solutia may suffer, incur, be responsible for or pay out by reason of Contractor's failure to comply with any such statutes, laws, ordinances, codes, rules or regulations.

h. If Contractor observes that the Specifications or Drawings are at variance with any statutes, laws, ordinances, codes, rules or regulations, the Solutia Representative shall be notified in writing and the necessary changes shall then be made as provided for in the Contract.

i. Contractor shall pay all applicable sales, consumer, use, service, occupation, privilege or other similar taxes required by law (including interest and penalties, if any) without reimbursement by Solutia, unless otherwise specifically set forth in the Contract. Contractor shall pay all Federal income, excise and all other Federal taxes and all State and Local income and personal property taxes, if any, arising in connection with the Work without reimbursement by Solutia.

j. The Contract shall be construed and interpreted in accordance with the laws and judicial decisions of the place of construction.

18. CONTRACTOR'S USE OF SITE; EMPLOYEES

a. Contractor shall confine its apparatus, operations, workmen and the storage of its materials and equipment to limits indicated by statutes, laws, ordinances, codes, rules, regulations, permits and directions of the Solutia Representative so as not to unreasonably encumber the Site.

b. Contractor shall confine its activities to the areas set aside for Contractor to do its work (the "Work Areas") and shall not interfere with any of Solutia's activities or with work of other contractors. Unless specifically authorized by the Solutia Representative, all persons engaged on the Work are prohibited from entering any Site areas except those Work Areas to which they are assigned.

c. Should any disturbance of existing installations be necessary, Contractor shall so inform the Solutia Representative well in advance of the time contemplated for such disturbance. After a plan acceptable to the Solutia Representative has been formulated, Contractor shall keep in close contact with the Work to see that it is executed in accordance with the agreed procedure; at no time shall this planning be entrusted to a foreman.

d. Contractor shall not load or permit any part of the construction to be loaded with a weight that will endanger its safety.

e. Contractor shall make proper provisions to receive, unload and store all materials, equipment and other things provided by Contractor and said materials, equipment and other things shall be stored at its risk.

f. Contractor shall abide by and enforce the Solutia Site Requirements for Contractors.

g. Contractor shall abide by and enforce the Solutia Representative's instructions regarding signs, advertisements, fires, smoking, etc.

h. Contractor shall abide by and enforce Solutia's rule which prohibits both the possession of a camera and the taking of pictures on Solutia's property.

i. Persons considered by Solutia to be under the influence of intoxicating beverages will not be admitted onto Solutia's property nor shall intoxicating beverages be carried onto, or consumed within the limits of, Solutia's property. Violation of this regulation will result in immediate and permanent removal of the individual from Solutia's property.

j. Contractor shall at all times enforce strict discipline and good order among its employees, and shall not employ on the Work any unfit person or anyone not skilled in the work assigned. Contractor shall, upon notice from the Solutia Representative, remove from the Work any employee objectionable to Solutia

k. Contractor agrees to advise and confer with Solutia with regard to agreements with and/or obligations to labor organizations before commitments are made, and thereafter with regard to action in or settlement of pending work force interruptions, controversies, disputes and the like. Contractor agrees to abide by any disapprovals of Contractor's proposed actions which Solutia makes known to the Contractor.

19. PRODUCT APPROVAL; SUBSTITUTIONS

a. To afford time for proper investigation and checking, Contractor shall, within fifteen (15) days after the execution of the Contract, submit to Solutia for approval the names of all manufacturers, materialmen and dealers whom it proposes furnish materials or equipment. No manufacturer will be approved for furnishing any item in connection with the Work unless, in the opinion of Solutia, it is of good reputation, has a plant of ample capacity, is a successful producer of such item and, in the case of a cost-plus contract between Solutia and Contractor, submits prices and terms of payment acceptable to Solutia

b. In requesting prices, Contractor, subject to the provisions of Section 8 hereof, shall provide the manufacturer, materialman or dealer with all pertinent information from the Drawings and Specifications, plus all other pertinent information as to the requirements of the Contract.

c. Without causing delay in the Work, Contractor shall submit samples to the Solutia Representative as specified or required and shall execute the Work in accordance with only such samples as are approved. Where the Specifications require the manufacturer's printed directions for installation, Contractor shall provide such directions with all samples or drawings submitted for approval. Contractor shall prepay transportation charges on all samples forwarded to the Solutia Representative's office for approval.

d. Contractor shall not order any items for which samples are required nor shall it make any substitutions in such items until it has received the Solutia Representative's approval, and Contractor shall furnish items equal in every respect to the approved samples.

e. Where several items are specified by name for one use, Contractor may select any specified item. Whenever an item or class of material is specified exclusively by brand name, manufacturer's name or catalog reference, only such item shall be used, unless the Solutia Representative's written approval for substitution is secured. Should Contractor desire to substitute another item for the one or more specified, Contractor shall apply in writing to the Solutia Representative for permission, stating its reasons for desiring to make such substitution and describing with particularity the addition or deduction in cost involved. By proposing a substitution, Contractor represents that the Contractor: has investigated the substitute and determined that it is equal or superior in all respects to that specified; will provide the same warranty for the substitution that Contractor would provide for the item specified; certifies that the cost data presented is complete and includes all related costs and waives all claims for additional costs related to the substitution that subsequently become apparent; and will coordinate the installation of the approved substitute, making changes as may be required for the Work to be complete in all respects.

f. No such approval shall relieve Contractor from responsibility for deviations from the requirements of the Contract or for the proper performance of the Work.

20. CONSTRUCTION ITEMS AND REQUIREMENTS

a. Unless otherwise expressly stated in the Contract, Contractor shall provide and pay for all operations, labor, materials, equipment and all things (including, but not limited to, all items, tools, supplies, articles, appurtenances, apparatus, machinery, appliances, scaffolding, utilities, services, sanitary facilities, supervision, transportation, incidentals and expenses) necessary for the proper performance of the services or construction of the facilities outlined in the Contract.

b. Unless otherwise expressly stated in the Contract, all materials and equipment shall be new and of good workmanship and quality. Contractor shall, if required, provide

satisfactory evidence as to the kind and quality of the materials and equipment it will furnish.

c. Unless otherwise expressly stated in the Contract, all materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

d. Certain items in the Drawings and Specifications may be noted as being furnished by Solutia. Contractor, as part of the Work, shall provide approved storage facilities, unload, provide receipts for and store all materials, equipment and other items furnished by Solutia or others for installation or erection by Contractor; if such items are already in storage, Contractor shall take custody of them when directed by the Solutia Representative. Contractor shall check, account for, care for and protect such items in the same manner as if such items were to be furnished by Contractor under the Contract.

e. As part of the Work, Contractor shall "rough-in," provide pipe or electrical connections and prepare the construction in every way for all items indicated to be subsequently provided by Solutia

f. Contractor agrees that Solutia may receive such material, equipment and other items during the progress of the Work as it sees fit (even though various parts of the Work are not completed) without extra cost to Solutia Contractor further agrees to permit the placing of such equipment into operation by Solutia's employees or representatives, and that such action shall not constitute acceptance of the Work or any part thereof or a waiver of any claims by Solutia, nor shall it relieve Contractor of any of its responsibilities under the Contract.

21. APPROVAL OF PAYMENTS; ACCEPTANCE; FINAL PAYMENT

a. If Contractor has made application for payment as set forth in the Agreement, the Solutia Representative shall, within the time specified, approve for payment to Contractor such amount as the Solutia Representative decides to be properly due, or give Contractor the reasons for withholding approval in accordance with Section 22 hereof.

b. When the Contractor considers the Work substantially completed, it shall advise the Solutia Representative in writing and request inspection of the Work. Contractor shall develop a punch list of Work that requires correction or is not yet fully complete and provide such punch list to the Solutia Representative at the time of the inspection, along with a schedule for correcting and completing such Work. To be substantially complete, the Work shall be sufficiently complete in accordance with the Contract Documents so that Solutia can occupy or utilize the Work for its intended use and only minor items of Work remain to be performed. The Solutia Representative shall inspect the Work. If the Solutia Representative disagrees that the Work is substantially complete, the Contractor shall complete such Work and again notify the Solutia Representative so that it may reinspect the Work. If the Solutia Representative identifies Work that requires correction or is incomplete that has not been included on the Contractor's punch list, the Contractor shall revise the punch list to include such Work. The Contractor shall diligently perform the

correction and completion of the punch list Work in accordance with the punch list schedule. Failure to include an item on the punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

c. When Contractor considers the Work fully completed, it shall advise the Solutia Representative in writing and request inspection and acceptance of the Work. Promptly thereafter, the Solutia Representative shall make such inspection. When the Solutia Representative finds the Work to be completed and acceptable, Solutia Representative shall promptly advise Contractor in writing that the Work has been fully completed and is accepted by the Solutia Representative on behalf of Solutia

d. After such written acceptance of the Work, Contractor shall submit appropriate application for final payment and Solutia shall then make final payment within sixty (60) days after receipt of such application. Such final payment shall not be due, however, until Contractor has submitted evidence satisfactory to Solutia that (i) all payrolls, materials bills and other indebtedness connected with the Work have been paid, which may include a contractor's affidavit; (ii) consent of surety (if any) to final payment; (iii) receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by Solutia. If a Subcontractor refuses to furnish a release or waiver required by Solutia, the Contractor may furnish a bond satisfactory to Solutia to indemnify Solutia against such lien.

e. If the Work has been substantially completed by Contractor, but full completion thereof is materially delayed through no fault of Contractor, Solutia shall, without terminating Contractor's obligations under the Contract, make payment of the balance due for that portion of the Work fully completed and accepted, including any withheld retainage. Contractor shall make application for such payment, itemized and supported by evidence, as set forth in the Contract.

f. Neither the making of partial payment to Contractor, nor the partial or entire use or occupancy of the Work by Solutia, shall constitute an acceptance of the Work or any part thereof.

g. The acceptance of final payment shall constitute of waiver of all claims by Contractor and its Subcontractors and suppliers except for those previously made in writing and identified as unsettled at the time of final application for payment.

22. RETAINAGE; WITHHOLDING OF PAYMENTS TO CONTRACTOR

a. If specified in the Contract, Solutia will retain a percentage of the approved amount of each application for payment in the percentage specified in the Contract ("retainage"). Such retainage will be held until the Work is fully complete, unless otherwise specified in the Contract.

b. In addition to any retainage, Solutia may withhold payment to Contractor to such additional extent as may be necessary to protect Solutia from loss on account of:

i) Defective Work not remedied;

ii) Claims filed or evidence reasonably indicating the probable filing of claims;

iii) The failure of Contractor to either make payments properly to Subcontractors, or for equipment, material or labor, or to provide evidence that such payments have been made;

iv) Damage to another;

v) Any cost for which Contractor is liable under the Contract; or

vi) A breach by Contractor of any term, condition or provision of the Contract.

c. When the grounds for withholding payment above the retention are removed, payment of such withheld amounts shall be made.

23. CHANGES IN WORK; CLAIMS

a. Solutia, without invalidating the Contract, may make changes in the Drawings or Specifications, issue additional instructions, let separate contracts to others for portions of the Work, designate itself as a supplier of labor, equipment or materials or require additions to or deductions from the Work (herein referred to as "changes"); and the contract price, the contract fee or the Not-To-Exceed or maximum cost, if any, shall be adjusted accordingly. The terms, conditions and provisions of the Contract shall apply to all such changes with the same effect as if such changes were a part of the Contract from the outset, except that any claim for an extension of time caused thereby shall be adjusted at the time such change is ordered.

b. In giving oral instructions, the Solutia Representative shall have authority to make minor changes in the Work not involving extra cost and not inconsistent with the purposes of the Work; but otherwise, except in an emergency endangering life or property, no changes in the Work shall be made except pursuant to a written order from the Solutia Representative ("Change Order") and no claim for additional payment or reimbursement shall be valid without such a Change Order.

c. If Contractor claims that oral or written instructions from the Solutia Representative, whether by Drawings, Specifications or otherwise, involve extra cost under the Contract (when the Work is on a lump-sum, Not-to-Exceed cost, or unit-price basis), it shall give Solutia written notice of such extra cost within ten (10) days following the receipt of such instructions and, except in an emergency endangering life or property, before proceeding to carry out the instructions. Such claim shall include all costs associated with the change in Work. No such claim shall be valid where the aforementioned procedure is not followed by Contractor.

d. The value of any such change in the Work (under a lump-sum, Not-To-Exceed or maximum cost or unit-price type contract) shall be determined in one or more of the following ways:

i) By estimate and acceptance in a lump sum;

ii) By unit prices named in the Contract or subsequently agreed upon;

iii) By a cost-plus-a-fixed fee;

iv) By cost-plus-a-percentage fee as set forth in the Agreement or as may be subsequently agreed upon.

e. When Contractor receives a Change Order as set forth herein, it shall proceed with the change. When the value is to be determined as set forth in subsections 23d i), 23d ii) or 23d iii), Contractor shall keep a correct account of all quantities of labor, equipment, materials, etc., and costs therefor, itemized in such form and supported by such evidence as stated in the Agreement, and shall present it to the Solutia Representative, who shall approve such amounts as the Solutia Representative determines to be due to Contractor.

f. Contractor shall promptly, and before such conditions are disturbed, notify the Solutia Representative in writing of: (i) subsurface or latent physical conditions at the Site differing materially from those indicated in the Contract, or (ii) unknown physical conditions at the Site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. The Solutia Representative shall promptly investigate the conditions, and if the Solutia Representative finds that such conditions do so materially differ and cause an increase or decrease in Contractor's cost of, or time required for, performance of the Work, an equitable adjustment shall be made and the Contract modified in writing accordingly. No claim of Contractor for adjustment hereunder shall be allowed unless it has given notice as herein required.

g. If Contractor believes that additional cost or additional time is involved for any reasons not otherwise specifically addressed elsewhere in the Contract, Contractor shall give Solutia written notice within 21 days after the event giving rise to such claim or after Contractor first recognizes the conditions giving rise to the claim, whichever occurs later. The responsibility to substantiate the claim shall rest with the Contractor. Failure to follow the process set forth in the Contract for filing a claim shall result in Contractor's waiver of such claim.

24. CORRECTION OF WORK BEFORE FINAL PAYMENT

a. Contractor shall promptly remove from the Site all Work identified by the Solutia Representative as failing to conform to the Contract. Contractor shall promptly correct, replace or re-execute such Work in accordance with the Contract and without expense to Solutia Contractor shall also bear the expense of making good all work of other contractors which has been destroyed or damaged by such correction, removal, replacement or re-execution.

b. If Contractor does not correct or remove such nonconforming Work within ten (10) days, or such longer time as may be fixed by written notice from Solutia to Contractor, Solutia may, without prejudice to other remedies Solutia may have, correct or remove the nonconforming Work and may store the removed material or equipment at the expense of Contractor. If Contractor does not pay the expenses of such correction, removal and

storage within ten (10) days' time thereafter, Solutia may, upon ten (10) days' prior written notice, sell such materials or equipment at auction or at private sale; provided, however, that Solutia shall account to Contractor for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by Contractor. In the event that such costs and expenses exceed the proceeds of the auction or private sale, Contractor shall promptly pay such excess to Solutia upon its request. Solutia may also deduct the excess costs and expenses from payments then or thereafter due the Contractor.

25. WARRANTY AND CORRECTION OF WORK AFTER FINAL PAYMENT

a. Contractor warrants that it shall use sound engineering and construction principles and practices in the performance of the Work and that it shall apply to the Work that degree of skill, care, judgment and supervision necessary to assure that the Work shall be of good quality, with workmanship proper, fit, suitable and sufficient for the purpose contemplated and in accordance with the prevailing good trade practices. Contractor further warrants that materials and equipment furnished by Contractor under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Contractor shall fulfill the terms of all special guarantees established by the Contract. This warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by Solutia, Contractor shall provide satisfactory evidence as to the kind and quality of materials and equipment.

b. In addition to the Contractor's obligations in Section 25a, if within one (1) year from the date of final payment under the Contract (or such longer period as may be either provided in the Contract or as may be available to Contractor without additional cost to Solutia) any Work is found to be defective or otherwise not in accordance with the Contract Documents, the Contractor shall correct it promptly after receiving written notice from Solutia to do so, unless Solutia previously specifically accepted in writing such condition.. Solutia shall give such written notice promptly upon discovery of the condition requiring correction. In the event that Contractor fails to correct the defective or nonconforming Work within a reasonable time after receipt of the written notice from Solutia, Solutia may correct such Work and Contractor shall reimburse Solutia for the costs thereof upon written demand by Solutia to Contractor. Contractor shall also pay for any resulting damage to other property and work occasioned by its breach of any of the aforementioned warranties or guaranties.

c. Solutia's rights under this Section 25 are in addition to and without limitation or waiver of any other rights or remedies, at law or in equity, which it may either have under the Contract or to which it may otherwise be entitled. Nothing in this section shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one year period for correction of Work as described in Section 25b relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced

nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations under the Contract other than specifically to correct the Work.

26. DEDUCTIONS FOR UNCORRECTED WORK

If Solutia deems it inexpedient to correct damaged or defective Work, an equitable deduction from any amounts otherwise due Contractor shall be made therefor.

27. DELAYS AND EXTENSIONS OF TIME

a. If, in the opinion of the Solutia Representative, Contractor is delayed at any time in the progress of the Work by any act or neglect of Solutia, other than such acts as relate to changes in the Work as provided for in Section 23, CHANGES IN WORK, hereof, or by separate contractor employed by Solutia, then the time of completion shall be extended for such reasonable time as the Solutia Representative may decide and Contractor shall be reimbursed for any direct damages which Contractor can show were incurred as a direct result of such delay.

b. No such extension, nor reimbursement for any direct damage, shall be made for delay or damage occurring more than seven (7) days before a claim therefor is made in writing to the Solutia Representative. In the case of a continuing cause of delay, only one claim is necessary.

c. If no schedule or agreement is made stating the dates upon which Drawings shall be furnished by Solutia, then no claim for delay shall be allowed on account of failure to furnish Drawings; provided, however, that if such Drawings have not been furnished within two (2) weeks after a demand therefor, then only such claim as is reasonable for delay in excess of said two weeks shall be allowed.

d. No delay in performance by either party hereto shall constitute default hereunder or give rise to any claims for damage if, and to the extent, such delay is caused by occurrences beyond the control and without the fault or negligence of the party affected, including, but not limited to, acts of God or the public enemy, expropriation or confiscation of facilities, compliance with any order of any governmental authority, acts of war, rebellion or sabotage, fires, floods, explosions, riots, strikes, unusual delay in transportation or unavoidable casualties.

e. This Section 27 does not preclude the recovery of damages for delay occasioned by Contractor's fault or negligence under the Contract.

28. SOLUTIA'S RIGHT TO DO WORK

If, in the opinion of the Solutia Representative, Contractor neglects to prosecute the Work properly or fails to perform any term, condition or provision of the Contract, Solutia, after three days' written notice to Contractor may, without prejudice to any other available remedy, make good such deficiencies and deduct the cost thereof from payment either then

or thereafter due Contractor or if such amount is not sufficient to cover such cost, the Contractor shall pay the difference to Solutia upon written demand therefor.

29. RIGHT TO TERMINATE CONTRACT; RIGHT TO SUSPEND WORK

a. If Contractor makes a general assignment for the benefit of its creditors; if it persistently or repeatedly refuses or fails (except in cases for which extension of time is provided) to supply enough properly skilled workmen or proper materials or equipment; if it should fail to make prompt payment to Subcontractors or for labor, materials or equipment; if it should persistently disregard statutes, laws, ordinances, codes, rules or regulations; or if it should otherwise be guilty of substantial violation of any term, condition or provision of the Contract, then Solutia, without prejudice to any other right or remedy and after giving the Contractor seven (7) days' written notice, may terminate the Contract, take possession of the premises and all materials, equipment and all else thereon, and finish the Work by whatever method Solutia deems expedient. In the event any of the aforementioned events occur, payment shall be handled in the following manner:

i) Under a lump-sum or unit-price type contract, Contractor shall not be entitled to receive further payment until the Work is finished; if the unpaid balance of the Contract Price exceeds Solutia's expense of finishing the Work, including compensation for additional engineering, managerial, administrative and legal services, such excess shall be paid to Contractor; if such Solutia expenses exceed such unpaid balance, Contractor shall promptly pay the difference to Solutia upon its request.

ii) Under a cost-plus type contract, Contractor shall be paid for the balance of reasonable payments reimbursable to it under the Contract, but no additional payments will be made on account of fee except unpaid installments of fee accrued prior to the month of termination; Solutia shall also pay to Contractor fair compensation, either by purchase or rental at the election of Solutia, for any construction equipment retained.

b. By giving written notice to Contractor, Solutia may also at any time, terminate the Contract for its convenience even though none of the instances set forth in Section 29a have occurred and, as part of said notice or within a reasonable time thereafter, may order Contractor to stop the Work, to sell at auction or private sale any unincorporated materials or equipment at the Site, and to remove its tools and equipment from said Site. In the event Solutia elects to terminate the Contract for its convenience, payment shall be handled in the following manner:

i) Under a lump-sum or unit-price type contract, Contractor shall be entitled to receive payment from Solutia for reasonable costs actually and necessarily incurred by Contractor in performing the Work prior to the effective date of the termination notice, less amounts previously paid and less amounts recovered through sale of materials, equipment and all other items not yet incorporated into the Work.

ii) Under a cost-plus type contract, Contractor shall be paid for the balance of reasonable payments reimbursable to it under the Contract, plus a fee computed upon the cost of the Work to the effective date of the notice of termination at the rate of percentage named in the Contract; or if Contractor's fee is stated as a fixed sum, Solutia shall pay Contractor such an amount as will increase the payments on account of its fee to a sum which bears the same ratio to the said fixed sum as the cost of the Work at the time of termination bears to a reasonable estimate of the cost of the Work had it been completed.

c. In either case under this Section 29b, Solutia also shall pay any reasonable termination costs for all subcontracts that Contractor has, in good faith, undertaken or incurred in connection with the Work prior to receiving any notice of termination. At its option, Solutia ma request Contractor to assign, and Contractor agrees it will assign if requested, any or all subcontracts, obligations or commitments that Contractor has undertaken in connection with the Work.

d. Contractor shall, as a condition precedent to receiving the payments mentioned in this Section 29, execute and deliver all such papers and take all such steps, including the legal assignment of its contractual rights, as Solutia may require for the purpose of fully vesting in it the rights and benefits of Contractor under such contracts, obligations or commitments which Contractor has undertaken or incurred in connection with the Work and which Solutia may advise Contractor it is assuming.

e. Upon any termination as set forth herein, Solutia shall be entitled to defer payment to Contractor to the extent of all bona fide claims it or others may have against Contractor arising out of or in connection with the Contract or the Work until such claims have been settled. No payment shall be due until Contractor has submitted evidence satisfactory to the Solutia Representative that all payrolls, materials bills and other indebtedness connected with the Work have been paid.

f. By giving written notice to Contractor, Solutia may also at any time, suspend, delay or interrupt the Work in whole or in part for such period as Solutia may determine. In the event Solutia elects to suspend the Work, Contractor shall be entitled to receive payment from Solutia for reasonable costs actually and necessarily incurred by Contractor in suspending the Work, including reasonable profit thereon. No adjustment shall be made to the extent that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible or that an equitable adjustment is made or denied under another provision of the Contract.

30. INSPECTION; TESTING

a. Solutia and its representatives shall at all times have access to the Work wherever it is in preparation or progress and Contractor shall provide safe and proper facilities for both access and inspection.

b. If the Specifications, the Solutia Representative's instructions, or any statutes, laws, ordinances, codes, rules or regulations, or any public authorities require the Work, or any

part thereof, to be specially tested or approved, Contractor shall give the Solutia Representative timely notice of its readiness for inspection and, if the inspection is by an authority other than the Solutia Representative, of the date fixed for such inspection; and Contractor shall secure all required certificates of inspection. Inspections by the Solutia Representative shall be made promptly and, where practicable, at the source of supply. If any Work should be covered without the approval or consent of the Solutia Representative, said Work must, if required by the Solutia Representative, be uncovered for examination at Contractor's expense.

c. Reexamination of questioned Work may be ordered by the Solutia Representative; and if so ordered, such Work must be uncovered by Contractor. If such Work is found to be in accordance with the Contract, Solutia shall pay the cost of uncovering, re-examination and replacement. If such Work is found not to be in accordance with the Contract, Contractor shall pay all such costs, unless it is found that the defect in the Work was caused by another contractor separately employed by Solutia; in which event Solutia shall pay such costs.

31. CLEANING UP

a. Contractor shall at all times keep all areas of the Work free from accumulations of waste materials or rubbish; and at the completion of the Work it shall remove all rubbish, debris, tools, scaffolding, equipment and machinery not part of the Work, and surplus materials from and about said areas and shall leave the Work "broom-clean" or its equivalent, unless more exactly specified.

b. If Contractor at any stage of the Work fails to clean up as required herein, Solutia may remove the rubbish and/or other items and charge to Contractor the entire cost or such portion thereof as the Solutia Representative considers proper.

32. CUTTING; PATCHING

a. Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and shall fit such Work to receive or be received by work of other contractors shown upon, or reasonably implied from, the Drawings and Specifications or other Contract Documents, and it shall patch and repair after the work of other contractors as the Solutia Representative may specify.

b. Any cost caused by defective or ill-timed Work shall be borne by the party who, in the opinion of the Solutia Representative, is responsible therefor.

c. Contractor shall not endanger the Work or the work of any other contractor by cutting or otherwise altering it, or by excavation, without the written consent of the Solutia Representative.

33. PROTECTION OF WORK, PROPERTY AND PERSONS

a. Safety is a core value at Solutia and behavior is to be aligned with the belief that all injuries are preventable. Each Contractor who enters the Site is accountable for

its own safety, and must take responsibility for the safety of individuals around it, especially those who the Contractor supervises. All injuries must be reported to the Solutia Representative and investigated with Solutia participation. In addition, all near misses must be reported and investigated as rigorously as other unsafe work practices which result in injury. Demonstrating safe behaviors and strict adherence to Solutia Site policies and procedures are a condition of the Contract and any violation shall result in removal from the Work.

b. Contractor shall continuously maintain adequate protection of the Work from damage and it shall protect property at the Work and adjacent thereto from injury or loss arising in connection with the Work.

c. Contractor shall comply with Solutia's policies, practices and rules for the Site; comply with Federal, State, county and municipal or local safety laws and building codes to prevent accidents, injury to persons or damage to property; erect and maintain necessary safeguards for protection of workmen and the public; and post danger signs warning against hazards created by construction features such as protruding nails, hod hoists, well holes, elevator hatchways, scaffolding, openings, stairways and falling materials. Contractor shall protect excavations, trenches and construction from damage from rain water, spring water, ground water, backing up of drains, sewers or any other water, and shall provide such pumps, equipment or enclosures as are needed. Contractor shall construct and maintain necessary temporary drainage and shall pump as necessary to keep the excavation or lowest level of the construction water-free. Contractor shall remove snow or ice as necessary for the safety of persons and property and for the proper protection of the Work.

d. Contractor shall designate a responsible member of its organization on the Work to prevent accidents and shall give Solutia the name of the person so designated. In the event of any accident, Contractor shall cooperate with the Solutia Representative in completing Solutia's Accident Report Form and shall within ten (10) days of such accident, furnish Solutia with a copy of all of Contractor accident report(s) related thereto.

e. In an emergency affecting the safety of life, the Work or adjoining property, Contractor, without special instructions or authorization from Solutia, shall act at its own discretion to prevent threatened injury or loss. Compensation claimed by Contractor on account of any emergency work shall be agreed upon promptly by negotiation.

f. Contractor shall remove any Work damaged by its failure to provide proper protection and shall replace the Work so damaged with new Work, all at no cost to Solutia

34. PROSECUTION OF THE WORK

a. Contractor shall supervise and direct the Work with efficiency and with appropriate skill and attention. Contractor shall coordinate all portions of the Work and shall be solely responsible for construction means, methods, techniques, sequences and procedures and for safety precautions and programs, unless the Contract Documents provide otherwise. If the Contract Documents set out specific instructions on construction means, methods,

techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, unless Contractor gives timely written notice to the Solutia Representative that such means, methods, techniques, sequences or procedures may not be safe, Contractor shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures.

b. Contractor shall assign key personnel to direct and manage the Work on a continuing basis and shall maintain at the site of the Work the necessary material, construction equipment in good operating condition, skilled workmen and all other things required to properly, safely and expeditiously prosecute the Work to completion.

c. Contractor shall keep on the Work during all stages of its progress a full time, competent superintendent and any necessary assistants, all satisfactory to the Solutia Representative. The superintendent shall assume all duties and responsibilities for supervision and scheduling of all facets of the Work including that of Subcontractors. The superintendent shall not be changed except with the consent of the Solutia Representative, unless the superintendent proves to be unsatisfactory to Contractor or ceases to be in its employ. Any replacement superintendant shall have similar qualifications and experience as the superintendent replaced. The superintendent shall be Contractor's on Site point of contact and will coordinate all Work efforts with the Solutia Representative and Solutia's other contractors, as applicable. The superintendent shall be the Contractor's representative and shall have authority to act on behalf of Contractor. All directions, notices and instructions given to the superintendent shall be as binding as if given to Contractor.

35. ALLOWANCES

a. The Contract Price or Not-to-Exceed-Cost shall include all allowances stated in the Contract for supplying certain materials or equipment for the Work, subject to adjustment after final selection by Solutia with respect to the quality, type and supplier of materials or equipment to be supplied.

b. Unless otherwise provided in the Contract Documents:

i) the cash allowances shall cover the cost to the Contractor of materials and equipment delivered to the Site and all required taxes, less applicable trade discounts.

ii) Contractor's cost for unloading and handling at the Site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Price or Not-To-Exceed-Cost, but not in the allowances and no adjustments for such costs and profit shall be made on account of such adjustments of the cash allowances.

iii) whenever the costs are more or less than the stated allowances, the Contract Price or Not-To-Exceed Cost shall be adjusted accordingly by Change Order. The Change Order shall reflect (i) the difference between the actual

costs for materials and equipment in Section 35bi and the stated allowances and (ii) any changes in the Contractor's costs under Section 35bii.

36. BONDS

Contractor, if required by Solutia at any time during the term of the Contract, shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising in connection therewith, said bonds to be in such form and amount as Solutia prescribes and with sureties which it approves. Under a lump-sum contract, if such bonds are required by instructions given prior to the submission of bids, the premiums shall be borne by Contractor; if subsequent thereto, they shall be borne by Solutia Inc. Under a cost plus fee, time and materials or unit price type contract, the premiums shall be considered a Reimbursable Cost of the Work. Each such bond shall contain a provision to the effect that changes in the Work and/or modifications to the Contract shall in no way relieve the surety of its obligations.

37. LIENS AND CLAIMS

No payment under the Contract shall become due and payable until Contractor, if required, has delivered to Solutia complete releases of all liens and all other claims of whatever nature which have arisen or which could arise as a result of any operations related to the Work or the Contract, or receipts in full in lieu thereof, and if required in either case, an affidavit that so far as Contractor has knowledge or information the releases and receipts include all operations, labor, equipment, materials and all things for which a lien or other claim could be filed or made. Said releases shall be effective as to liens and claims existing as of the date payment is requested. If any lien or other claim remains unsatisfied after all payments are made, Contractor shall refund to Solutia all moneys that Solutia may be compelled to pay in discharging such a lien or claim, including all costs and reasonable attorneys' fees.

38. TITLE TO WORK

The title to all Work completed or in the course of construction at the Site shall be in Solutia; and title to all materials, equipment and all other things intended for incorporation into the Work shall pass to Solutia upon delivery at the Site. Such passage of title shall not, however, relieve Contractor of any of its obligations under the Contract.

39. ASSIGNMENT

Contractor shall not assign the Contract in whole or in part or sublet it as a whole, nor shall Contractor assign any moneys due or to become due to it hereunder, without the prior written consent of Solutia Any attempt to so assign or sublet shall be void. Assignment or subletting with such consent shall in no way relieve Contractor of any of its obligations under the Contract.

40. USE OF MINORITY BUSINESS ENTERPRISES

It is Solutia's desire that certified minority and women business enterprises ("M/WBE") shall have the maximum practicable opportunity to participate in the Work. To carry out this desire, Contractor agrees to extend to known, certified M/WBE's an equitable opportunity to compete for subcontracts and purchase orders applicable to the Work, and in the award of subcontracts and purchase orders, to use qualified, competitive M/WBE's to the fullest extent consistent with efficient performance of the Work. As used in this paragraph, the term "minority and women business enterprise (M/WBE)" means a business certified as a Minority or Woman Owned Business Enterprise. Contractor shall submit to Solutia during the term of this Contract a written report, as requested by and in a form satisfactory to Solutia, setting forth (a) the names of the vendors certified as M/WBE's and which are used by Contractor in the performance of the Work hereunder, and (b) the services and/or goods provided in connection with the Work and the dollar amount expended by Contractor for such goods and/or services as called for by Contractor's report.

41. WAIVER; MODIFICATION; AMENDMENT

Except as otherwise specifically provided in the Contract, no waiver, modification or amendment of any term, condition or provision of the Contract shall be valid or of any force or effect unless made in writing, signed by the parties hereto or their duly authorized representatives, and specifying with particularity the nature and extent of such waiver, modification or amendment. No such waiver, modification or amendment shall, in any event, be construed to be a general waiver, abandonment, modification or amendment of any of the terms, conditions or provisions of the Contract, but the same shall be strictly limited and restricted to the extent and occasion specified in such writing.

42. CONFLICTS IN THE CONTRACT

a. In the event of conflicts in the Contract, the parts thereof shall take precedence and control in the following order:

i) Agreement;

ii) General Conditions;

iii) Drawings and Specifications.

b. Figure dimensions on the Drawings shall govern over scale dimensions, and detail Drawings shall govern over general Drawings.

43. TIME; ENTIRE AGREEMENT; CAPTIONS

a. All time limits stated in the Contract are of the essence thereof.

b. The Contract sets forth the entire agreement between Contractor and Solutia with respect to the subject matter thereof. All prior negotiations and dealings regarding the subject matter thereof are superseded by and merged into the Contract.

c. Captions used in the Agreement and General Conditions are inserted for convenience of reference only and shall not affect the construction of the Section captioned.

44. CONTRACTOR'S STATUS; RESPONSIBILITY

a. Contractor is and shall remain an independent contractor in the performance of the Work, maintaining complete control of its workmen and operations. Neither Contractor nor anyone employed or engaged by it shall become an agent, representative, servant or employee of Solutia in the performance of the Work or any part thereof.

b. Contractor agrees that it is fully responsible to Solutia for the errors, acts and omissions of its employees, its Subcontractors (and the employees thereof) and of all persons, firms and corporations (and the employees thereof) directly or indirectly employed or engaged by Contractor or any of its Subcontractors, all as if such errors, acts and omissions were its own.

45. SURVIVAL OF OBLIGATIONS; SUCCESSORS AND ASSIGNS

a. The obligations of Contractor and the rights of Solutia then accrued as well as those under the Procurement Discounts Accounting Section of the Agreement and Sections 2, INDEMNITY, 7, DRAWINGS AND SPECIFICATIONS, 8, CONFIDENTIAL INFORMATION, 9, INTELLECTUAL PROPERTY RIGHTS, 10, INTELLECTUAL PROPERTY INDEMNITY, 13, RELATIONS OF CONTRACTOR AND SUBCONTRACTOR, 15, MUTUAL RESPONSIBILITY OF CONTRACTORS, 17, SURVEYS; CONCEALED DEVICES; PERMITS; TAXES; LAW, 21, APPROVAL OF PAYMENTS; ACCEPTANCE; FINAL PAYMENT, 25, WARRANTY AND CORRECTION OF WORK, 29, RIGHT TO TERMINATE CONTRACT, 36, BONDS, 39, ASSIGNMENT, 44, CONTRACTOR'S STATUS; RESPONSIBILITY, 45, SURVIVAL OF OBLIGATIONS; SUCCESSORS AND ASSIGNS of these General Conditions shall survive any termination of the Contract, or the suspension, completion and/or acceptance of the Work or any part thereof, or final payment to Contractor, it being agreed between Contractor and Solutia that said obligations and rights are and shall be of a continuing nature and effect.

b. Contractor and Solutia for themselves, their successors, executors, administrators and assigns agree to the full performance of their respective covenants and obligations under the Contract.

46. STOP WORK ORDER

a. Solutia may, at any time by written order to Contractor, require Contractor to stop all, or any part, of the Work for a period of one hundred eighty days (180) days after the order is delivered to Contractor, and for any further period to which the parties may agree.

Any such order shall be specifically identified as a Stop Work Order issued pursuant to this Section. Upon receipt of such an order, Contractor shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the Work covered by the order during the period of Work stoppage. Within the aforementioned 180-day period of Work stoppage, or any extension thereof to which the parties shall have agreed, Solutia shall either:

i) cancel the Stop Work Order, or

ii) terminate the Work covered by such order pursuant to Section 29b hereof.

b. If a Stop Work Order issued under this Section is canceled or the period of the order or any extension thereof expires, Contractor shall resume the Work and:

i) Under a lump-sum, maximum cost or unit price type contract, an equitable adjustment shall be made in the completion date and/or the Contract Price.

ii) Under a cost-plus type contract, an equitable adjustment shall be made in the completion date and/or Contractor's fixed fee, if any; and in addition, Contractor shall be paid for Reimbursable Costs as defined in the Reimbursable Section of the Agreement.

c. In any case, however, the Contract shall be adjusted and modified in writing accordingly under this Section only if and to the extent that:

i) The Stop Work Order results in an increase in the time required for, or in Contractor's cost properly allocable to, the performance of the Work; and

ii) Contractor asserts a claim for such adjustment within thirty (30) days after the end of the period of Work stoppage; and

d. If a Stop Work Order is not canceled and the Work covered by such order is terminated pursuant to Section 29b hereof, the reasonable costs resulting from the Stop Work Order shall be allowed in arriving at any settlement under said Section 29b.

e. Solutia also may issue a Stop Work Order to Contractor to stop Work on all or a portion of the Work if Contractor fails to correct Work which is defective or otherwise not in accordance with the requirements of the Contract Documents or Contractor fails to supply sufficient skilled workmen or suitable materials or equipment for the Work after notice and right to cure has expired. When the cause for such Order is eliminated, the Work may recommence. In such case, the Contract shall not be adjusted as set forth above and the Contractor shall not be paid for any Reimbursable Costs incurred as a result of such Stop Work Order. Such right by Solutia shall not give rise to a duty on the part of Solutia to exercise this right for the benefit of Contractor or any other person.

47. **IMPACTED MATERIALS WORK.**

a. When Work involves intrusive activities at the Site, Contractor knows and understands that it may encounter materials which are, or may have been in contact with or contain substances that are, flammable, toxic, corrosive or hazardous. Contractor shall advise and inform its employees and subcontractors of the nature of such materials and the potential hazards connected with such materials and with the intrusive Work activities to be performed and shall see that all appropriate safety and handling precautions are followed to ensure the safety and well-being of persons, property and the environment in the performance of such Work. Contractor shall develop a specific employee health and safety plan for such Work which complies with the Site health and safety plan developed for the Work. Contractor shall deliver three (3) copies of such health and safety plan to the Solutia Representative prior to the commencement of any intrusive Work activities at the Site. Contractor will (1) inform all of its employees and its subcontractors' employees of the requirements of said plan; (2) conduct personnel training sessions as necessary prior to such individual's employment in connection with Work; and (3) be responsible for its employees and its subcontractors' employees compliance with said plan. Contractor will be responsible for seeing that all geotechnical and chemistry laboratories used by Contractor for testing of hazardous materials develop health and safety plans for the handling and testing of such hazardous materials prior to the laboratory testing of such samples. Appropriate and applicable Solutia safety procedures and requirements will be incorporated by Contractor into its site and laboratory health and safety plans.

b. All intrusive Work must be conducted in the presence of the Solutia Representative or its designee. In the event impacted materials are encountered or suspected, Contractor shall discontinue Work activities and a determination will be made, with the approval of the Solutia Representative, as to the course of action to be taken with respect to such Work activities. Such course of action shall be documented in writing and approved by the Solutia Representative. Solutia will arrange for the necessary transportation and disposal of any impacted materials to be removed from the Site in accordance with the approved plan; Contractor shall handle such impacted materials on Site in accordance with all applicable laws, regulations and rules until the materials are transported for disposal.

c. Only those cost items identified in the Contract Documents as "Contingency Costs" shall be allowed in addition to the Contract Price with respect to any Impacted Materials Work approved by the Solutia Representative and performed by the Contractor.

APPENDIX C
RATES

APPENDIX C

BROWZ

Company Registration Form For Solutia Inc.

General Instructions

Step 1 – Account Activation

The two items listed below must be completed before Browz can display your company's information to your Client. Your assigned Supplier Account Representative can help you complete the following items: .

- **Supplier Registration Agreement** - An unaltered copy of the agreement must be signed and submitted to Browz
- **Annual Subscription Fee** - An annual subscription fee of $595.00 must be paid to Browz

Step 2 – Data Collection

Upon completion of the registration process you will be required to submit specific data about your company. Your assigned Supplier Compliance Representative will guide you through the process of completing this form, collecting the required data, and submitting it to Browz.

Throughout this document the 'Stop Sign Icon & Brackets' will indicate when a question or section must be completed. The information you provide will be used to assess your company's compliance against your Client's compliance requirements.

Allow a minimum of five business days from the date Browz receives your information to process all completed forms and associated documents.

Website: www.browz.com
E-mail: processing@browz.com
Toll Free: (888) BROWZ-LC
(888) 276-9952
Fax: (801) 619-6050

Return Address: Browz, LLC
13997 S. Minuteman Dr.
Suite 150
Draper, Utah 84020

Supplier Registration Agreement to Participate in the Browz Supply Chain Verification Service (Page 1 of 2)

Sign and return Company Registration Form with all required documentation to Browz, LLC.

This Agreement between Browz, LLC, a Utah limited liability company, and the undersigned ("Company") sets forth the terms and conditions of Company's participation as a supplier in the Browz Supply Chain Verification Service (the "Service").

The Service facilitates the limited sharing of certain business information with Company's approved customers to help those Customers rely on Company's qualifications and compliance and to provide those Customers and Company with the efficiencies available from certain technology. Company shall approve or reject each customer before it becomes a "Customer". "Customers" means those customers which Company has approved to obtain or receive its information through the Service. This Agreement shall not require Company to provide any information to Browz.

Company grants Browz the right, without charge to Browz, to collect, verify, compile, organize and analyze information relating to Company (in raw or processed form, the "Information") and generate, use and distribute the Information, subject to the limitations set forth in this Agreement.

Browz may use, distribute and share information provided by Company to Browz only in connection with the following purposes:

1. To communicate with Company using Company's contact information.
2. To obtain and verify information.
3. To disclose to Customers as part of the Service.
4. To be included in a services registry to assist those using the Service in identifying and contacting prospective suppliers, contractors and vendors, provided that Company shall consent to be included.
5. To operate the Service and to offer other services to Company (for example, a service to help Company meet a Customer's policy). Browz relies on third parties to provide and support some of its business operations and services, including credit card processors, call centers, reviewers, auditors and attorneys. Browz requires those with whom it may share Confidential Information (defined below) to agree to similarly protect that Confidential Information.
6. To aggregate information - for example, to create and publish industry safety statistics.
7. To respond to subpoenas, court orders or legal process; to protect Browz's rights in lawsuits with third parties or, as applicable, Company; to prevent harm to any person; or as otherwise required by law or governmental order.
8. To protect Browz's rights, such as if Browz finds that Company's actions constitute improper use of the Browz web site or the Service or violate this Agreement.

Notwithstanding anything to the contrary in this Agreement, Browz may distribute Company's Confidential Information only: (a) to Customers, (b) as part of its business operations to operate the Service or (c) for a purpose specified in item 7 above, in which case Browz will provide Company with such notice as is practicable, by e-mail, fax, telephone, mail or otherwise as Browz shall reasonably determine to be appropriate, as soon in advance of any such actual disclosure referred to in item 7 as is reasonably practicable and appropriate under the circumstances and if legally possible. "Confidential Information" is material confidential and proprietary information (which may include future business plans and strategies, customer lists and data, technical data, technology, designs, drawings and financial information) provided to Browz by Company in accordance with this Agreement (or a prior supplier registration agreement between the parties) and identified in writing (within 10 days of being provided) by Company to Browz as "confidential" and not otherwise independently available, developed or ascertainable from public or non-public third-party sources. Browz acknowledges that Company will be irreparably harmed if Confidential Information is distributed in breach of this paragraph, and that Company would not have an adequate remedy at law in the event of such an actual or threatened breach by Browz. Therefore, Browz agrees that Company shall be entitled to seek injunctive relief against any actual or threatened breaches of this paragraph by Browz without the necessity of Company showing actual damages or showing that monetary damages would not afford an adequate remedy.

The Service includes information obtained by Browz from third-party sources, including under license from third-party licensors. Such third-party sources may include, but are not limited to, the Bureau of Labor Statistics of the U.S. Department of Labor, OSHA, NCCI (National Council on Compensation Insurance), State workers' compensation boards, Dun & Bradstreet, West Group (Westlaw®), ChoicePoint and LexisNexis. Licensed data is subject to restrictions, licenses, limitations of liability and warranties from the licensor. Company agrees that its use of any licensed data available from the Service is subject to the then-current Terms of Use for such licensed data on the Browz web site. BROWZ SHALL INCUR NO LIABILITY AS A RESULT OF OR DERIVED FROM ANY LICENSED DATA OR ANY ACTION OR INFORMATION SUPPLIED BY ANY SUCH THIRD PARTY, INCLUDING ANY GOVERNMENT AGENCY OR THIRD-PARTY LICENSOR.

Company represents and warrants that the information submitted (and which may be submitted in the future) by or on behalf of Company to Browz, which includes statements and documents and may include personal information, is and shall be accurate, up-to-date, complete and submitted in compliance with privacy and other applicable laws, and does not and shall not infringe any rights relating to personal privacy or publicity under the laws of the European Union or elsewhere. Company agrees to indemnify, defend and hold harmless Browz from any and all losses, claims, damages, liabilities and expenses, including reasonable attorneys' fees, arising out of or relating to any fraud by Company or violation by Company of any law or governmental rule or regulation or right of any entity or individual arising thereunder.

Supplier Registration Agreement to Participate in the Browz Supply Chain Verification Service (Page 2 of 2)

BROWZ DISCLAIMS ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), WITH RESPECT TO THE SERVICE OR OTHERWISE UNDER THIS AGREEMENT. COMPANY ACKNOWLEDGES THAT BROWZ MAKES NO REPRESENTATION OR WARRANTY THAT ANY CUSTOMER OR BROWZ CLIENT WILL APPROVE COMPANY AS A SUPPLIER OR POTENTIAL SUPPLIER, NOR AS TO ANY FUTURE ACTION OR REQUIREMENT OF ANY CUSTOMER OR BROWZ CLIENT.

IN NO EVENT SHALL BROWZ BE LIABLE TO COMPANY FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, MULTIPLE OR OTHER INDIRECT DAMAGES, OR FOR LOSS OF PROFITS, LOSS OF DATA OR LOSS OF USE DAMAGES, ARISING OUT OF THE SERVICE OR OTHERWISE UNDER THIS AGREEMENT, WHETHER BASED UPON WARRANTY, CONTRACT, TORT, STRICT LIABILITY OR OTHERWISE, EVEN IF BROWZ HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSSES.

ANY BROWZ LIABILITY ARISING OUT OF THE SERVICE OR OTHERWISE UNDER THIS AGREEMENT, WHETHER BASED UPON WARRANTY, CONTRACT, TORT, STRICT LIABILITY OR OTHERWISE, SHALL IN NO EVENT EXCEED THE AMOUNT PAID BY COMPANY TO BROWZ DURING THE MOST RECENT 12-MONTH PERIOD UNDER THIS AGREEMENT.

Some jurisdictions do not allow limitations on implied warranties, the exclusion or limitation of special, incidental, consequential, indirect or exemplary damages, or the limitation of liability to specified amounts, so the above limitations and exclusions may not apply to Company.

Browz grants Company a nonexclusive, non-assignable and nontransferable license to use the approved Browz Certification logo and to identify Company as "Browz Certified", subject in all cases to the terms, conditions, indemnification and limitations set forth in the Browz Certification Name and Logo Use Agreement which may be provided to Company by Browz upon request or available on the Browz web site, all the terms and conditions to which Company specifically agrees by using such name or logo.

This Agreement shall be deemed accepted by Company upon execution by Company or Company's electronic acceptance, and such acceptance is limited to the terms of this Agreement in the form presented to Company by Browz and excluding any modifications hereto made by Company and not accepted by Browz in writing. This Agreement, when so accepted by Company, constitutes the entire agreement of the parties with respect to the subject matter and supersedes any oral negotiations and prior writings with respect to the subject matter, including with respect to confidential or proprietary information and including all prior supplier registration agreements relating to the Service. Except as otherwise provided in this paragraph, no term or provision of this Agreement may be modified, amended or waived without the signed written agreement of both Company and Browz. Company's participation in the Service is subject to payment to Browz of all applicable fees.

This Agreement shall continue in effect until terminated by written notice from either party, provided that there shall be no refunds. All provisions in this paragraph, and all provisions in this Agreement relating to Confidential Information, representations, warranties, disclaimers, limitations of and exclusions from liability, and indemnification, shall survive termination of this Agreement. Should any provision hereof for any reason be declared invalid or unenforceable, the remaining portions of this Agreement shall remain in full force and effect. This Agreement shall be governed by, and construed in accordance with, the laws of the State of New York.

Agreed to by: COMPANY:

_____ _____

Print Name of Company Date

_____

Print entity jurisdiction and type (e.g., a New York corporation or a Utah partnership)

By: _____

Authorized Signature

_____ _____

Print Name and Title of Person Signing for Company Browz Registration ID

Return Address

Browz, LLC
13997 S. Minuteman Dr.
Suite 150
Draper, Utah 84020

Toll Free: (888) BROWZ-LC
(888) 276-9952
Fax: (801) 619-6050

Credit Card Payment

This section is provided for credit card payment

Card Type VISA ☐ Master Card ☐ American Express ☐ Discover ☐ Dollar Amount (US)

Card Number (no spaces or punctuation) Expiration (MM YY) CVV/CVC Code*

Name as it appears on card

Signature as it appears on card

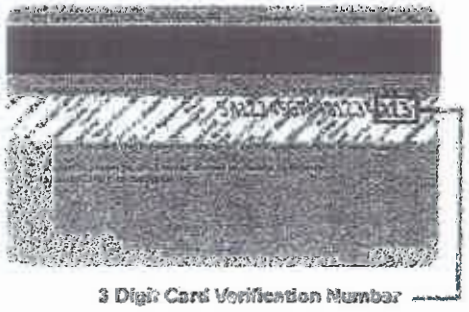
Date

*What is a CVV?

For your safety and security, our card processing server requires that you enter your card verification (CVV) number. The verification number is a 3 or 4 digit number printed on your card.

If you are using a Visa, Mastercard, or Bank card, it is the last 3 digits of the number that appears on the back of you card (see below).

If you are using an American Express card, the verification number is a 4 digit number that appears on the front of your card, above and either on the left or right of the card number (see below).



3 Digit Card Verification Number

4 Digit Card Verification Number

BROWZ

Solutia Inc.
Specific Requirements

Insurance Requirements

A sample insurance certificate outlining your Client's insurance requirements is available on the next page for you to give to your insurance agent

Commercial General Liability	Each Occurence	$2,000,000	Yes	No
Automobile Liability	Combined Single Limit	$1,000,000	Yes	No
Workers Compensation	Statutory	Statutory	No	Yes
Employer's Liability	Each Accident Disease – Each Employee Disease – Policy Limit	$1,000,000 $1,000,000 $1,000,000	No	No
Excess/Umbrella Liability	Each Occurrence Annual Aggregate	$1,000,000 $1,000,000	Yes	No

Certificate Holder - *Solutia Inc.*
c/o Browz Group
13997 South Minuteman Drive, Ste. 150
Draper, UT 84020

Additional Insured Language – "Solutia Inc., its subsidiaries, affiliates, and lessees."
Waiver of Subrogation Language – "Solutia Inc., its employees and agents, and Solutia's lessees."

Documents Checklist

Mandatory Documents

The following documents must be submitted in order for you to meet your Client's compliance requirements

Included	Sent Separately	
☐	☐	Copies of Liability Insurance Certificates for all company liability insurance policies as outlined in "Requirements" above.
☐	☐	Copy (digital if available) of Environmental, Safety & Health program meeting govt. requirements applicable to your work.
☐	☐	Copy of Substance Abuse Policy & Program.
☐	☐	**Copies of OSHA 300/300A logs for the past 3 years.** If you are exempt from OSHA recordkeeping, provide equivalent injury/illness documentation.
☐	☐	Copies of EMR documentation for the past 4 years.

Other Documents

The following documents have been requested by your Client, but are not required in order for you to meet your Client's compliance requirements

Included	Sent Separately	
☐	☐	Copies of Minority/Women-Owned Business Certifications, if applicable.
☐	☐	Documentation of Legal Issues, if applicable.

ACORD CERTIFICATE OF LIABILITY INSURANCE

Issue Date (mm/dd/yy)

PRODUCER
Insurance Agent name
Insurance Agent address
Insurance Agent phone number

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THIS CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
Your Company name and address

Your Insurance Agent will populate this document.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Insurance Carrier's Name	
INSURER B: Insurance Carrier's Name	
INSURER C:	
INSURER D:	
INSURER E	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$ 2,000,000
		COMMERCIAL GENERAL LIABILITY	Your policy # will go here	Policy effective date (mm/dd/yy)	Policy expiration date (mm/dd/yy)	DAMAGE TO RENTED PREMISES (Ea occurrence)	$
		CLAIMS MADE ☐ OCCUR				MED EXP (Any one person)	$
						PERSONAL & ADV INJURY	$
		GEN'L AGGREGATE LIMIT APPLIES PER:				GENERAL AGGREGATE	$
		POLICY ☐ PRO-JECT ☐ LOC				PRODUCTS - COMP/OP AGG	$
		AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
		ANY AUTO					
		ALL OWNED AUTOS	Your policy # will go here	Policy effective date (mm/dd/yy)	Policy expiration date (mm/dd/yy)	BODILY INJURY (Per person)	$
		SCHEDULED AUTOS				BODILY INJURY (Per accident)	$
		HIRED AUTOS					
		NON-OWNED AUTOS				PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY				EACH OCCURRENCE	$ 1,000,000
		OCCUR ☐ CLAIMS MADE	Your policy # will go here	Policy effective date (mm/dd/yy)	Policy expiration date (mm/dd/yy)	AGGREGATE	$ 1,000,000
		Specify Excess or Umbrella					$
		DEDUCTIBLE					$
		RETENTION $					$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	Your policy # will go here	Policy effective date (mm/dd/yy)	Policy expiration date (mm/dd/yy)	WC STATU-TORY LIMITS / OTH-ER	
		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?				E.L. EACH ACCIDENT	$ 1,000,000
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
						E.L. DISEASE - POLICY LIMIT	$ 1,000,000
		OTHER					
		Professional Liability (if submitted)	Your policy # will go here	Policy effective date (mm/dd/yy)	Policy expiration date (mm/dd/yy)		
		Environmental Liability (if submitted)					

Minimum $ requirements

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Additional Insured language must appear as follows on the General Liability, Automobile Liability and Excess/Umbrella Liability Policies: "The above General Liability, Automobile and Excess/Umbrella Liability policies have been endorsed to add "*Solutia Inc., its subsidiaries, affiliates, and lessees as additional insured.*"

Waiver of Subrogation language must appear as follows on Workers Compensation and Employer's Liability, "The Workers Compensation & Employer's Liability policies have been endorsed to include a waiver of subrogation as to Solutia Inc., its employees and agents, and Solutia's lessees."

CERTIFICATE HOLDER

Solutia Inc.
c/o Browz Group, LC
13997 S. Minuteman Dr., Suite 150
Draper, UT 84020

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Agent Signature Required

Company

Your organization's legal name is:

What is your organization's preferred name?

Select your organization's legal structure: ☐ Corporation ☐ Partnership ☐ Sole Proprietorship ☐ LLC/LC ☐ Nonprofit

Site Type: ☐ Headquarters ☐ Regional/Branch ☐ Subsidiary

If your organization has a DBA ("Doing Business As") name, enter it below:

Organization Address:

City State Zip Code

Phone Number (no hyphens or punctuation, include country code if outside USA) Fax Number

Toll Free Number

Web Site Address (Leave off http://www. prefix.)

In what year (yyyy) was your organization established?

Government Identifier (FEIN, GST, TIN, etc):

Market Your Products or Services Through Browz

Check "Yes" if you would like to be included in a services registry to allow prospective customers seeking pre-qualified contractors or suppliers to see limited identifying information about your Organization, such as your organization's name, contact information, industry classification, and minority and women business status. This may result in additional bidding opportunities for your Organization. Yes ☐ No ☐

Industry

Specify your company's primary and secondary business classification industry code. You may use a value from the SIC (Standard Industry Code) or NAICS (North American Industry Classification System). See http://www.osha.gov/oshstats/sicser.html or http://www.census.gov/epcd/www/naics.html, or from UNSPSC (Universal Standard Products & Services Classification) see http://www.unspsc.org.

☐ NAICS Primary: Industry Code Secondary: Industry Code ☐ UNSPSC

Solutia

Do you have on call capability, 24 hours a day every day? Yes ☐ No ☐

What would be your response time to the Solutia Plant_____Min.

Will you agree to adhere to Solutia Local Site Substance Abuse Policy for Contractors? Yes ☐ No ☐

Have all of your subcontractors met Solutia qualifications and appear on our Browz list of qualified contractors? If No, they must register with Browz. Yes ☐ No ☐

Do you agree to comply with Solutia's English Proficiency requirement that all contractor employees, and visitors to Solutia facilities must communicate in English with that level of proficiency, and to the extent necessary, to ensure their safety and the safety of others? NOTE: this is a Solutia policy & requirement. Yes ☐ No ☐

Contacts

Tell us who we should contact at your company concerning this information. E-mail is our preferred method of contacting you concerning problems, announcements, and expiration notices. Do not list an e-mail address for someone who should not be given access to information submitted to Browz. **Specify one contact as the primary contact by placing a check (√) next to Primary Contact.**

Contact 1: First Name | Last Name (Surname)

Phone Number (no hyphens or punctuation) | Extension | Position or Job Title

E-mail Address | Primary Contact (√) ☐

Contact Notification Settings: Indicate the number of notifications that this contact should receive and the number of days prior to or after an expiration event that this contact should be notified (if left blank, the default will be 3 notifications at 10 days prior, the day of expiration, and 5 days after expiration):

☐ Pre-Notification #1 # of days prior ☐ Pre-Notification #2 # of days prior ☐ Pre-Notification #3 # of days prior

☐ Post-Notification #1 # of days after ☐ Post-Notification #2 # of days after

Contact 2: First Name | Last Name (Surname)

Phone Number (no hyphens or punctuation) | Extension | Position or Job Title

E-mail Address | Primary Contact (√) ☐

Contact Notification Settings: Indicate the number of notifications that this contact should receive and the number of days prior to or after an expiration event that this contact should be notified (if left blank, the default will be 3 notifications at 10 days prior, the day of expiration, and 5 days after expiration):

☐ Pre-Notification #1 # of days prior ☐ Pre-Notification #2 # of days prior ☐ Pre-Notification #3 # of days prior

☐ Post-Notification #1 # of days after ☐ Post-Notification #2 # of days after

Contact 3: First Name | Last Name (Surname)

Phone Number (no hyphens or punctuation) | Extension | Position or Job Title

E-mail Address | Primary Contact (√) ☐

Contact Notification Settings: Indicate the number of notifications that this contact should receive and the number of days prior to or after an expiration event that this contact should be notified (if left blank, the default will be 3 notifications at 10 days prior, the day of expiration, and 5 days after expiration):

☐ Pre-Notification #1 # of days prior ☐ Pre-Notification #2 # of days prior ☐ Pre-Notification #3 # of days prior

☐ Post-Notification #1 # of days after ☐ Post-Notification #2 # of days after

Owners/Key Personnel

List the owners and key personnel of your organization. For large publicly traded companies, list only key personnel.

Full Legal Name	Title	% of Ownership
		%
		%
		%
		%
		%

Project Team Members

List the full names of the primary members of the proposed Project Team

Full Legal Name	Present Position	Related Experience
		Years
		Years
		Years
		Years
		Years
		Years
		Years

Related Entities (Affiliates/Subsidiaries/Joint Ventures)

If this section is not applicable, check "n/a." ☐ n/a

List affiliates, subsidiaries, holding companies, joint ventures, etc., of your organization. Include the name of the affiliate, address, telephone number, and percentage of ownership. Also, list the top executive of the affiliate.

Affiliate Name & Address	Phone	Percentage Owned	Top Executive's Name	*Type of Relationship
		%		
		%		
		%		
		%		
		%		
		%		

*Type of Relationship: 1. Joint Venture (JV), 2. Parent Co (PC), 3. Holding Co (HC), 4. Subsidiary (S), 5. Other (O), please explain

Products and Services

Please list briefly products and services your company provides. List up to ten items.

Product or Service #1

Product or Service #2

Product or Service #3

Product or Service #4

Product or Service #5

Product or Service #6

Product or Service #7

Product or Service #8

Product or Service #9

Product or Service #10

Planning/Scheduling

Do you have maintenance/project planning and scheduling capabilities? Yes ☐ No ☐

If yes, Software used: _____

Description of Program: _____

References/Contracts

Enter up to two of your company's largest jobs, or up to two of your largest customers, clients, or contracts.

Job 1: Reference Company Name

Contract Number

Address

Functioned as Prime Contractor

Functioned as Subcontractor

Contact First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation)

Extension

Fax Number (no hyphens or punctuation)

Start Date (MM DD YYYY)

Value of Work Performed by Your Own Forces (US $)

Total Value of Project or Contract (US $)

End Date (MM DD YYYY)

Job 2: Reference Company Name

Contract Number

Address

Functioned as Prime Contractor

Functioned as Subcontractor

Contact First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation)

Extension

Fax Number (no hyphens or punctuation)

Start Date (MM DD YYYY)

Value of Work Performed by Your Own Forces (US $)

Total Value of Project or Contract (US $)

End Date (MM DD YYYY)

Enter up to three credit references

Credit Reference 1: Reference Company Name

Address

Contact First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation, include country code if outside USA)

Fax Number

References Continued

If this section is not applicable, check "n/a." n/a ☐

Credit Reference 2: Reference Company Name

Address

Contact: First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation, include country code if outside USA)

Fax Number

Credit Reference 3: Reference Company Name

Address

Contact: First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation, include country code if outside USA)

Fax Number

Enter a a bank reference.

Bank Reference 1: Reference Company Name

Address

Contact: First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation, include country code if outside USA)

Fax Number

Account Number

Legal

Please print or type clearly in the text boxes below.

Is your organization a party to any judgments, claims, or lawsuits pending or outstanding? If yes, please explain below. ☐ Yes ☐ No

Is your organization involved in any bankruptcy or reorganization proceedings? If yes, please explain below. ☐ Yes ☐ No

Employees and Work Hours

List your company's total employees and total hours worked by all employees, including management, starting with the last full 3 years.

	Last Year	Two Years Ago	Three Years Ago
Employees			
Hours Worked			

Accident/Incident History

Report your company's accidents and incidents for the last three full years, or the last full years your company has been in business. Even if your company is exempt from recording accidents/ incidents per OSHA 29 CFR Part 1904 you are still required to report ACTUAL experience.

Refer to http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=3205 for more information about U.S. Department of Labor accident and incident reporting law.

Accident/Incident History (Use this section even if not required per OSHA)

	OSHA Log Location	Last Year	Two Years Ago	Three Years Ago
Fatality Cases	("Q" on 300 log)			
Lost Workday Cases	("H" on 300 log)			
Restricted Workday Cases	("I" on 300 log)			
Other Recordable Cases	("J" on 300 log)			

Government Issued Citations/Violations

Total your citations/violations from OSHA or the EPA for each of the last 3 years.

	Last Year	Two Years Ago	Three Years Ago
OSHA Citations/Violations			
EPA Citations/Violations			

Experience Modification Rating (EMR)

Please list your Experience Modification Rate (EMR) for each year. EMRs are obtained from your workers compensation insurance carrier or ordered on the Internet at www.ncci.com. Because EMRs do not become effective based on a calendar year, provide 4 years of values and the effective (start) date for each. If applicable, answer the questions provided if your company does not have an EMR.

	EMR	Effective Date (MM DD YYYY)	
Present year			No EMR for this year ☐
Last Year			No EMR for this year ☐
Two Years Ago			No EMR for this year ☐
Three Years Ago			No EMR for this year ☐

If your company does not have an EMR for any of the above years, provide a written explanation as to why your company does not have one. Use the space provided or include a letter on company letterhead.

EHS Practices

Use this section to identify the types of programs and policies related to Environmental, Health, and Safety. Due to the many ways in which program terms are interchanged, please use the individual questions to define the program that best applies to your organization. For example, if your program is a "Health and Safety" Program, select yes to "Health Program" and yes to "Safety Program." If your program is an "Environmental, Health, and Safety" or a "Health, Safety, and Environmental" Program, select "yes" to "Environmental Program," "Health Program," and "Safety Program."

Environmental

	Yes	No
Does your company have a formal written Environmental Policy?	☐	☐
Does your company have a formal written Environmental Program?	☐	☐

Health

	Yes	No
Does your company have a formal written Health Policy?	☐	☐
Does your company have a formal written Health Program?	☐	☐

Safety

	Yes	No
Does your company have a formal written Safety Policy?	☐	☐
Does your company have a formal written Safety Program?	☐	☐

EHS Program

Mark below all topics and procedures in your company's EHS program. Indicate the section in which each item is located (New Employee Orientation, EHS Employee Training, Foreman/Supervisor Training and EHS Procedures). Please leave boxes blank that are not applicable (n/a). Only mark in those that apply.

	New Employee Orientation	EHS Employee Training	Foreman/ Supervisor Training	EHS Procedures
Access/Egress	☐	☐	☐	☐
Accident Investigation	☐	☐	☐	☐
Air Quality Management	☐	☐	☐	☐
Business Continuity Planning	☐	☐	☐	☐
Chemical & Material Safety	☐	☐	☐	☐
Commercial Motor Vehicle Operation	☐	☐	☐	☐
Confined Space Procedure	☐	☐	☐	☐
CPR	☐	☐	☐	☐
Disciplinary Action	☐	☐	☐	☐
Electrical Safety	☐	☐	☐	☐
Emergency Protocols	☐	☐	☐	☐
Emergency Response Procedure	☐	☐	☐	☐
Employee Responsibilities	☐	☐	☐	☐
Energy Isolation Procedure (Lock-out/Tag-out)	☐	☐	☐	☐
Environmental Protection & Practices	☐	☐	☐	☐
Equipment & Materials	☐	☐	☐	☐
Equipment Inspection/Maintenance	☐	☐	☐	☐
Evaluations	☐	☐	☐	☐
Fall Protection (Safety Belts and Harnesses)	☐	☐	☐	☐
Fire Protection/Prevention	☐	☐	☐	☐
First Aid Procedures	☐	☐	☐	☐
Hazard Communication	☐	☐	☐	☐
Hazard Recognition	☐	☐	☐	☐
Hazardous Materials Transport	☐	☐	☐	☐
Hearing Protection	☐	☐	☐	☐
Hot Work Procedures	☐	☐	☐	☐
Housekeeping	☐	☐	☐	☐

	New Employee Orientation	EHS Employee Training	Foreman/ Supervisor Training	EHS Procedures
H2S Alive	☐	☐	☐	☐
Hazardous Waste Operation & Emergency Response HAZWOPER	☐	☐	☐	☐
Heavy Equipment Operation	☐	☐	☐	☐
Inspections	☐	☐	☐	☐
Job Hazard Analysis/Control	☐	☐	☐	☐
Ladder Safety	☐	☐	☐	☐
Medical Management of Work Related Injuries/Illnesses	☐	☐	☐	☐
Medical Procedures	☐	☐	☐	☐
Meetings	☐	☐	☐	☐
Modified Work Plan	☐	☐	☐	☐
Personal Protective Equipment (including Head, Eye, Face, Body Hand, Foot)	☐	☐	☐	☐
Recycling	☐	☐	☐	☐
Refresher Training	☐	☐	☐	☐
Respiratory Protection including Respirator Use	☐	☐	☐	☐
Rigging and Crane Safety	☐	☐	☐	☐
Safe Work Practices	☐	☐	☐	☐
Safety Supervision	☐	☐	☐	☐
Scaffold User	☐	☐	☐	☐
Scaffolding Procedures (Building)	☐	☐	☐	☐
Signs, Barricades, Roping Perimeter Guarding, Flagging	☐	☐	☐	☐
Spill Prevention and Control	☐	☐	☐	☐
Tool Box Meetings	☐	☐	☐	☐
Trenching and Excavation	☐	☐	☐	☐
Waste Management (Solid and Hazardous)	☐	☐	☐	☐
Waste Recycling	☐	☐	☐	☐
Water Quality Management	☐	☐	☐	☐
Welding	☐	☐	☐	☐

If any of the following topics are included in your Environmental – Health – Safety Program, answer the additional questions.
If a section is not applicable, skip the section.

Accident Investigation

	Yes	No
Does your company have a policy requiring employees to report all accidents, environmental incidents, injuries, and occupational illnesses?	☐	☐
Does your company have a written program for employees to report all accidents, environmental incidents, injuries, and occupational illnesses?	☐	☐
Does your company have a program for investigating all accidents, environmental incidents, injuries, and occupational illnesses?	☐	☐
Do you maintain a first aid log?	☐	☐
Are all accidents, injuries, and illnesses reviewed with all contract personnel?	☐	☐
Does senior management participate in incident investigations?	☐	☐
Does your organization's accident investigation program require the identification of a root cause?	☐	☐

If yes, what root cause method is used? Histograms ☐ Pareto Charts ☐ Fishbone Diagrams ☐ Process Mapping ☐ Other (identify below) ☐

Other root cause method:

Chemical and Material Safety

	Yes	No
Does your organization have Material Safety Data Sheets (MSDS) for hazardous materials and chemicals on all job sites?	☐	☐
Are all employees trained in the known potential fire, explosion, or toxic release hazards related to their job, as well as the process and applicable provisions of an emergency action plan?	☐	☐
Can you provide documented evidence that each employee has received and understands the required training?	☐	☐
If yes, does the documentation include employee names and training dates?	☐	☐
Are there procedures to ensure that employees follow safety rules?	☐	☐
Does your organization have a working knowledge of the statutory requirement concerning contractor responsibility in processing plants containing regulated hazardous materials as established by OSHA Process Safety Management of Highly Hazardous Chemicals, 29 CFR 1910.119 or EPA Risk Management Regulations?	☐	☐

Provide your Hazardous Waste Generator ID Number if applicable.

	Yes	No
Do you have training and procedures for handling, transportation, and storage of toxic substances? If yes, please attach supporting documentation.	☐	☐

Select all toxic substances addressed in training materials: Arsenic ☐ Asbestos Abatement ☐ Benzene ☐ Hydrogen Sulfide ☐ Lead ☐ Polychronated Biphenyl (PCBs) ☐ Other toxic substances ☐

CHEMICAL TRANSPORTATION:
Would you anticipate transporting chemicals to or from a client's property during the course of work? ☐ Yes ☐ No
If yes, explain the nature of the transportation and your qualifications to do so.

Emergency Protocols

Does your organization have a written plan to implement site-specific emergency protocols for each office, job site, or project? ☐ Yes ☐ No

Environmental Protection & Practices

	Yes	No
Does your organization have an environmental quality manual?	☐	☐
Does your organization conduct environmental awareness training?	☐	☐
Does your organization audit environmental compliance programs?	☐	☐

If any of the following topics are included in your Environmental – Health – Safety Program, answer the additional questions.
If a section is not applicable, skip the section.

Evaluations

Do management and employee performance evaluations include Environmental - Health - Safety performance? ☐ Yes ☐ No

What level of management in your company receives field safety reports?

Inspections

Mark the frequency that your organization conducts Environmental - Health - Safety project inspections:

☐ Weekly ☐ Biweekly ☐ Monthly ☐ Quarterly ☐ Semiannually ☐ Annually

Does your organization have a Workplace Inspection Form? If yes, please attach a copy. ☐ Yes ☐ No

Heavy Equipment Operation

	Yes	No
Does your organization currently have procedures that govern the operation, training, and certification with respect to fork trucks, cranes, and heavy equipment?	☐	☐
Do operators of fork trucks, cranes, and heavy equipment have the required medical clearance and training certificates?	☐	☐

Meetings

Mark the frequency that your organization conducts and documents field Environmental - Health - Safety meetings?

☐ Daily ☐ Weekly ☐ Biweekly ☐ Monthly ☐ Quarterly ☐ Semiannually ☐ Annually

Does your organization conduct site Environmental – Health – Safety meetings for any of the following? Mark all that apply.

☐ Contractor Employees ☐ Field Supervisors ☐ Subcontractors ☐ Crew/Team

	Yes	No
Do you have a training outline for all levels of employees? If so, please attach the training outline including a sample record.	☐	☐

Personal Protective Equipment

Select the types of personal protective equipment used: ☐ Head ☐ Eye ☐ Face ☐ Body ☐ Hand ☐ Feet

	Yes	No
Is applicable PPE provided for employees?	☐	☐
Do you have a program to assure that PPE is inspected and maintained?	☐	☐

Respiratory Protection

Does your company's work require employees to use respiratory equipment?	☐ Yes	☐ No
Have your company's employees been medically approved for respiratory protection?	☐ Yes	☐ No
Have your company's employees been fit tested for respiratory equipment?	☐ Yes	☐ No
Have your company's employees been trained in the use of respiratory protection equipment?	☐ Yes	☐ No

Safe and Secure Workplace

	Pre-employment	Random	For Cause	Post Accident	Not at All
Mark each occurrence in which your company conducts substance abuse testing.	☐	☐	☐	☐	☐
Mark each occurrence in which your company conducts alcohol abuse testing	☐	☐	☐	☐	☐

	Yes	No	n/a
Does your company perform background checks for each employee?	☐	☐	☐

Training

How often does your organization conduct refresher training?

☐ Weekly ☐ Biweekly ☐ Monthly ☐ Quarterly ☐ Semiannually ☐ Annually

	Yes	No
Do you require on-site supervision to have OSHA 30-hour Training Course?	☐	☐
Do you have certified trainers?	☐	☐

EHS Personnel

Please mark the existence of any of the following persons or teams within your company. (Check all that apply.)

☐ Key EHS Personnel Who Support EHS Programs
☐ High-level Corporate Officer(s) Responsible for EHS Compliance
☐ Front-line Supervisors Trained to Oversee and Administer the EHS Program
☐ Safety Committee or EHS Committee
☐ On-site supervisors to ensure compliance with safety regulations
☐ Management of subcontractors to ensure compliance with safety regulations

List up to three people designated as key EHS personnel, preferably one representative from each position type.

Position Type: (Check all that apply.) Environmental ☐ Health ☐ Safety ☐ Other (please list)

Name

Phone Number (no hyphens or punctuation) | Extension | Position or Title

Position Type: (Check all that apply.) Environmental ☐ Health ☐ Safety ☐ Other (please list)

Name

Phone Number (no hyphens or punctuation) | Extension | Position or Title

Position Type: (Check all that apply.) Environmental ☐ Health ☐ Safety ☐ Other (please list)

Name

Phone Number (no hyphens or punctuation) | Extension | Position or Title

EHS System Registrations

Check all EHS System Registrations or Certifications that apply to your company. Please include the name of the registrar or agency and enter the expiration date, if any.

If this section is not applicable, check "n/a." n/a ☐

☐ OSHA VPP — Name of registrar or certifying agency:
Expiration Date (MM DD YYYY)

☐ ISO14001:2000 — Name of registrar or certifying agency:
Expiration Date (MM DD YYYY)

☐ OHSAS 18001 — Name of registrar or certifying agency:
Expiration Date (MM DD YYYY)

☐ Other — If Other is checked, please identify:
Name of registrar or certifying agency:
Expiration Date (MM DD YYYY)

Licenses

List any applicable licenses below. Identify the license type, issuer, license number, and expiration date for each. If more space is needed, please copy this page.

If this section is not applicable, check "n/a." n/a ☐

License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

Issuer (Country, State, City, County, Agency, etc.)

License Number

Expiration Date (MM DD YYYY)

License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

Issuer (Country, State, City, County, Agency, etc.)

License Number

Expiration Date (MM DD YYYY)

License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

Issuer (Country, State, City, County, Agency, etc.)

License Number

Expiration Date (MM DD YYYY)

License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

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License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

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Issuer (Country, State, City, County, Agency, etc.)

License Number

Expiration Date (MM DD YYYY)

License Type: Business ☐ Contractor ☐ Professional/Occupational ☐ Other (please list) ☐

Issuer (Country, State, City, County, Agency, etc.)

License Number

Expiration Date (MM DD YYYY)

Labor Agreements

Please list any labor agreements if applicable to your business. List the agreement name, type, the associated facility, and the expiration date. If more space is necessary, copy this page.

If this section is n/a not applicable, check "n/a." ☐

Labor Agreement Name

Labor Agreement Type

Facility

Expiration Date (MM DD YYYY)

Labor Agreement Name

Labor Agreement Type

Facility

Expiration Date (MM DD YYYY)

Labor Agreement Name

Labor Agreement Type

Facility

Expiration Date (MM DD YYYY)

Labor Agreement Name

Labor Agreement Type

Facility

Expiration Date (MM DD YYYY)

Labor Relations Manager:

First Name

Last Name (Surname)

Phone Number (no hyphens or punctuation)

Extension

Associations/Affiliations:

Please list (e.g., NECA, ABC, AGC, SMACNA, USA, Business Roundtable, Local User Groups, CII)

National Maintenance Agreement Policy Committee (NMAPC):

List Agreements to which your company is signatory.

Title of Agreement

Number of work hours worked in last 5 years

Collective Bargaining Agreements to which you are signatory

Craft Local Number Holder of your Bargaining Rights

Bonding

Enter up to 5 of your most recent bonds.

If this section is not applicable, check "n/a." n/a ☐

1. Bond Number

Bond Type: Surety ☐ Performance ☐ Claim Filed? Yes ☐ No ☐

Surety Company

Surety Company Contact Person

Surety Contact Phone Number (no hyphens or punctuation) | Bond Amount US $ (Penal Sum) | Expiration Date (MM DD YYYY)

2. Bond Number

Bond Type: Surety ☐ Performance ☐ Claim Filed? Yes ☐ No ☐

Surety Company

Surety Company Contact Person

Surety Contact Phone Number (no hyphens or punctuation) | Bond Amount US $ (Penal Sum) | Expiration Date (MM DD YYYY)

3. Bond Number

Bond Type: Surety ☐ Performance ☐ Claim Filed? Yes ☐ No ☐

Surety Company

Surety Company Contact Person

Surety Contact Phone Number (no hyphens or punctuation) | Bond Amount US $ (Penal Sum) | Expiration Date (MM DD YYYY)

4. Bond Number

Bond Type: Surety ☐ Performance ☐ Claim Filed? Yes ☐ No ☐

Surety Company

Surety Company Contact Person

Surety Contact Phone Number (no hyphens or punctuation) | Bond Amount US $ (Penal Sum) | Expiration Date (MM DD YYYY)

5. Bond Number

Bond Type: Surety ☐ Performance ☐ Claim Filed? Yes ☐ No ☐

Surety Company

Surety Company Contact Person

Surety Contact Phone Number (no hyphens or punctuation) | Bond Amount US $ (Penal Sum) | Expiration Date (MM DD YYYY)

Financial Information

Answer the following questions.

D&B Rating:

Net Worth: $

Assets/Liabilities:

Current Assets $

Current Liabilities $

Annual sales volume for the past 3 years:

Year $

Year $

Year $

Largest job during the last 3 years: $

In what geographic area(s):

Construction/Maintenance Equipment:
List the % of Equipment which your organization owns, leases or rents:

Owned %

Leased %

Rented %

Supplier Diversity

Please answer all business classifications that apply to your company.

Small Business: Is your business considered a small business based upon the criteria and size standards defined by the Small Business Act (13CFR Part 121.1) and Public Law (95-507)? Yes ☐ No ☐

If yes, is your business registered with SBA via the Central Contractor Registration (CCR) database (formerly Pro-Net)? Yes ☐ No ☐

Small Business Administration (SBA) Certifications: Is your business currently certified by the SBA under any of the following classifications:

	Yes	No
Small Disadvantaged Business (SDB)	☐	☐
8(a) Business Development Program	☐	☐
HUBZone	☐	☐
DOT Disadvantaged Business Enterprise	☐	☐

If yes to any of the SBA Certifications, please complete the following:

Name of agency or organization you are certified with: _____

Date certification expires: (MM DD YYYY) ____ ____ ____ (Attach copy of certificate.)

Minority-Owned Business: Is your business at least 51% owned by one or more minority U.S. citizens? In the case of any publicly owned business, at least 51% of the stock must be owned by one or more of such individuals, and its management and daily operations must be controlled by one or more such individuals. Yes ☐ No ☐

If yes to any of the SBA Certifications, please complete the following designation: n/a ☐ African American ☐

Hispanic American ☐ Native American ☐ Asian-Pacific American ☐ Asian-Indian American ☐

Other ☐ Specify: _____

Has your business been certified as a Minority-Owned Business? Yes ☐ No ☐

If yes, please complete the following:

Name of agency or organization you are certified with: _____

Date certification expires: (MM DD YYYY) ____ ____ ____ (Attach copy of certificate.)

Women-Owned Business: Is your business at least 51% owned by a woman or women who exercise the power to make policy decision and who are actively involved in the day to day management of the business? Yes ☐ No ☐

Has your business been certified as a Women-Owned Business? Yes ☐ No ☐

If yes, please complete the following:

Name of agency or organization you are certified with: _____

Date certification expires: (MM DD YYYY) ____ ____ ____ (Attach copy of certificate.)

Other Business Classifications: Is your company classified as a:

	Yes	No
- Foreign A concern that is not incorporated in the US or an unincorporated concern having its principal place of business outside the United States.	☐	☐
- Non-profit A business or organization that has received non-profit status under IRS Regulation 501-C3.	☐	☐
- Sheltered A sheltered workshop or other equivalent business basically employing the handicapped.	☐	☐

Please indicate in the space below how your firm complies with the above definition(s).

Affirmative Action

	Yes	No
Does your Company have an Affirmative Action Plan for employees?	☐	☐
Does your Company include training/orientation on sexual harassment in the workplace?	☐	☐

Assisting Your Customers by Participating in the Browz Supply Chain Verification Service

By participating in the Browz Service, you are assisting your current customers and, if you wish, helping prospective customers select you as a new supplier to them. Browz is in the business of helping companies such as yours comply with the contract selection and compliance requirements of your current and potential customers. Browz provides its Service by gathering information from your Company and various commercial and governmental sources available to the public such as reporting agencies and information services. Browz uses the information to verify information submitted to Browz by your Company and to provide selected information to your customers and prospective customers approved by you. Those customers have specifically requested this selected information.

Your Company must agree to the Supplier Registration Agreement to become a supplier whose information may be verified by the Browz Service, as requested by at least one of your customers. This agreement is in writing to provide Browz with the right to provide the Browz Service for your Company and cannot be changed. No changes made by you will be valid.

If you have any further questions, please call us at 888-276-9952 or e-mail us at operations@browz.com.

APPENDIX D

APPENDIX E

TECHNICAL SPECIFICATIONS

Nitro, West Virginia
RCRA Interim Measures
Final Caps and Covers Installation

Prepared for:

Solutia Inc.
PO Box 66760
St. Louis, Missouri 63166-6760

Prepared by:

Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, West Virginia 25304
Phone: (304) 342-1400 Fax: (304) 343-9031
Email: potesta@potesta.com

Project No. 0101-01-0081-700C

May 2, 2012

POTESTA

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SECTION 900 – SEQUENCE OF CONSTRUCTION

This sequence of construction has been developed to guide the Contractor in a logical, step-by-step progression of the RCRA Interim Measures Final Caps and Covers Installation. This sequence of construction has been divided into two main parts: riverbank stabilization/capping and final caps and covers installation. The proposed final caps and covers construction sequence has been further divided for convenience as work on the Process Area (PA) caps and covers and work on the Waste Treatment Area (WTA) caps and covers.

The sequence of construction presented herein is suggested. It is possible that the Contractor may propose revisions to this sequence of construction and/or develop a sequence of construction containing greater detail and/or additional steps. Contractor revisions shall be submitted to Solutia for review and approval prior to deviation from this sequence of construction.

1.0 RIVERBANK STABILIZATION/CAPPING

Work shall be in accordance with the Technical Specifications and the Drawings.

1. Install erosion and sediment control to control stormwater from work areas. Installation of erosion and sediment controls can be staged as needed to control runoff from disturbed areas.

2. This proposed sequence of construction contemplates that riverbank stabilization activities begin prior to or occur concurrently with construction of the caps and covers. This is required so that materials excavated as part of riverbank stabilization can be placed under the low permeability caps and/or low permeability covers. Refer to Section 1100 – Excavation of the Specifications for more requirements.

3. Clear and grub riverbank work areas. Tree tops, branches, trunks, brush and vegetation above the ground surface shall be removed from the site and appropriately disposed. The Contractor shall be responsible for notifying Solutia as to the disposition of this material. Vegetation shall be cut at ground level, removed, chipped, and/or mulched and disposed in a permitted solid waste landfill. This may require obtaining special permission from the West Virginia Department of Environmental Protection, Division of Water and Waste because Solid Waste Management Rules prohibit yard waste from being placed in solid waste landfills. Dismantle the existing chain link fence along the top of riverbank. Steel posts, fence fabric, and other metal hardware may be recycled by the Contractor for its scrap value. Concrete and soil shall be removed from fence posts and placed under the low permeability caps.

4. Relocate Teavee Oil & Gas pipeline in the Process Area.

5. The riverbank shall be excavated to result in a proper slope in accordance with the Drawings. Prior to beginning excavation of the riverbank, Contractor shall deploy super silt fence along the waters edge and a floating turbidity control curtain in order to control erosion and sedimentation during excavation of the riverbank. Super silt fence and turbidity curtain shall remain in-place until rock riprap is in-place on the riverbank. Excavation of the riverbank is anticipated to be performed from the riverbank side as opposed to from a barge. Stone is anticipated to be placed from barges.

6. In order to control sediments during riverbank stabilization, the following limits shall be observed while conducting work.

    a. The maximum length of riverbank allowed to be cleared ahead of the riprap placement shall be 300 feet.
    b. The maximum length of riverbank allowed to be excavated in advance of placed riprap shall be 120 feet.
    c. Geotextile placement shall be limited to that amount that can be covered with riprap to the full template in seven days.
    d. Riprap shall be placed from the toe of slope to the top of excavated bank in a single pass.

7. Excavated soil and debris from the riverbank shall be placed as the general soil fill layer under the low permeability cap and/or the low permeability cover. Excavated soil and debris (concrete, rubble, stone, etc.) shall be placed under the area to receive the low permeability cap initially. If additional excavated material exists than can be incorporated in the general soil fill layer under the low permeability cap, then this excess excavated material shall be placed in the general soil fill layer in the area to receive the low permeability cover. Tree roots shall be ground/processed to a mulch and disposed of by mixing with excavated materials and placed as part of the general soil fill layer under the low permeability cap and/or low permeability cover.

8. Once a proper riverbank slope has been prepared, the surface to be covered by riprap shall be covered with the riverbank stabilization geotextile.

9. Riverbank stabilization geotextile shall be covered with rock riprap in accordance with the Drawings.

10. Following placement of rock riprap, the floating turbidity control curtain shall be removed from the riverbank work area. Super silt fence shall be left in place during and following excavation and placement of geotextile and riprap. Excessive accumulations of sediments that form behind the super silt fence shall be removed and placed under the low permeability caps and covers when they interfere with riverbank armoring.

2.0 FINAL CAPS AND COVERS INSTALLATION

Work shall be in accordance with the Technical Specifications and Drawings.

The following construction sequence is proposed for the caps and covers of the Solutia Nitro property. The caps and covers work may be performed in conjunction with the riverbank stabilization work; however, excavation of soils, debris, and other material from the riverbank stabilization work shall be completed prior to placement of the geosynthetic layers of the low permeability caps and low permeability covers. This is required since materials excavated from the riverbank work area shall be incorporated into the general soil fill layer under the low permeability caps and low permeability covers.

Caps and covers are required in the WTA (Solutia Nitro property north of Interstate 64) and the PA (Solutia Nitro property south of Interstate 64). The Contractor may work on caps and covers in both areas simultaneously or one following the other. The suggested construction sequence for the caps and covers is presented separately for the WTA and PA.

2.1 PA Caps and Covers

1. Sediment and erosion control measures shall be implemented in the PA downgradient of areas to be disturbed. This shall include silt fence along the perimeter of the property (existing chain-link fence along the south, east, and north property lines and along the top of the riverbank on the west side of the PA work area). During construction of the caps and covers, sediment control shall include the development of sediment basins to control stormwater runoff prior to discharge to the Kanawha River. The ability to construct sediment basins is limited by the flat topography of the property and subsurface conditions. Sediment basins will be limited as to their depth and location.

   The existing sediment basin located east of the Outlet 001 headwall and valves discharge structure shall be upgraded/enlarged and used to control stormwater runoff and sediments from the PA. Caps and covers shall be constructed generally working from the perimeter of the PA toward the Outlet 001 sediment basin. The Outlet 001 sediment basin shall be maintained for as long as possible prior to consolidating sediments in the upper end of the basin and completing the permanent permeable cover over the Outlet 001 sediment basin area.

2. Install the stormwater collection system including corrugated plastic pipes and drop inlets leading toward the Outlet 001 sediment basin area. Storm Lines 1, 2, 3, and 4 shall be constructed and the discharge from Storm Line 1 shall be routed to discharge into the Outlet 001 sediment basin for sediment control. Material excavated from Storm Lines 1, 2, 3, and 4 shall be placed under the low permeability cap or the low permeability cover.

3. Begin construction of the caps and covers. Construction of caps and covers will occur over a multi-year period due to the size of the area being covered and the logistics

associated with grading, cover and cap layer installation, and the quantity of off-site soil borrow required. In general, the order of the caps and covers construction shall be:

Initial Construction - Low permeability cap constructed over the PA soil-bentonite slurry wall area.

Followed by - Low permeability cap constructed over the PDA soil-bentonite slurry wall area.

Followed by - Low permeability cover constructed in the southeastern portion of the PA.

Followed by - Permanent permeable cover over the remainder of the PA.

The Contractor shall conduct his operations for construction of the caps and covers in such a manner to achieve control of stormwater while avoiding contamination of the vegetative soil cover layer from stormwater runoff from uncapped and uncovered areas of the site. This will require staging of construction such that stormwater runoff from the site during construction will be directed to the Outlet 001 sediment basin. This may require pumping, construction of berms, diversion of stormwater, or other measures to control stormwater runoff. The Contractor shall plan and conduct his construction operations in such a manner as to avoid stormwater runoff flowing from uncapped or uncovered areas over or across areas where geomembrane, composite drainage layer, geotextile, and/or vegetative soil cover has been placed. This requirement has been specified to avoid "contamination" of "clean" layers of the caps and covers from stormwater runoff that has been in contact with impacted materials.

4. The low permeability caps shall be constructed as follows and in accordance with the Drawings and Specifications. The Contractor shall construct the general soil fill layer using materials excavated from the riverbank stabilization, materials excavated from the PA work area, and off-site soil borrow material. The general soil fill layer shall be brought to the proposed subgrade elevations to allow for proper drainage of the cap layers and final surface. The Contractor shall then construct the geotextile cushion, 40-mil HDPE geomembrane, and composite drain layer. The Contractor shall construct cap system underdrains which shall be piped to the stormwater collection system drop inlets. The Contractor shall then construct the vegetative soil cover layer followed by revegetation of the low permeability cap.

5. The low permeability cover shall be constructed next in accordance with the Drawings and Specifications. The Contractor shall construct the general soil fill layer using materials excavated from the riverbank stabilization, materials excavated from the PA work area, and off-site soil borrow material. The general soil fill layer shall be brought to the proposed subgrade elevations to allow for proper drainage of the cap layers and final surface. The Contractor shall then construct the 40-mil HDPE geomembrane, the

geotextile, the cap system underdrains (which shall be piped to the stormwater collection system drop inlets), and the vegetative soil cover layer followed by revegetation.

6. The Contractor shall construct the permanent permeable cover over the areas shown on the Drawings and in accordance with the Specifications. The Contractor shall place a layer of geotextile over the prepared subgrade. The subgrade shall be prepared by removing any protruding objects that could damage the geotextile. The subgrade shall be prepared in a smooth and uniform condition. Following placement of the geotextile, the Contractor shall place the vegetative soil cover layer using soil from the off-site borrow source supplied by Solutia's off-site soil borrow provider. The vegetative soil cover layer shall be revegetated.

7. The final activity of construction of the caps and covers at the PA shall be cleaning/removal of sediments from the stormwater collection piping and drop inlets. Sediments accumulated in the Outlet 001 sediment basin will be removed from the bottom and side slope areas and consolidated in the northern end of the sediment basin. The Contractor shall then cover the surface of the Outlet 001 sediment basin with geotextile and cover the sediment basin bottom and side slopes with 18 inches of clean soil from the off-site borrow area supplied by Solutia's off-site soil borrow provider followed by revegetation.

2.2 WTA Caps and Covers

Sediment and erosion control measures will be implemented in the WTA downgradient of areas to be disturbed. This will include silt fence and super silt fence along the perimeter of the areas to be disturbed as shown by the Drawings.

1. The project will also include construction of a new sediment basin in the A-3 Basin channel located to the north of the area to receive caps and covers. The majority of the WTA caps and covers work area will drain to the A-3 Basin sediment basin for sediment control prior to being discharged to the Kanawha River through WV/NPDES Outlet 003. The sediment basin hereinafter referred to as the Outlet 003 sediment basin shall be constructed prior to regrading or other construction in the WTA.

2. The Contractor shall perform excavation of the drainage channels and swales in the WTA such that runoff from the work area drains to the Outlet 003 sediment basin. Excavated materials shall be placed as the general soil fill layer under the caps and covers. Excavated soil appearing clean and free of impacted material can be placed as general soil fill under the low permeability cap, low permeability cover, and permanent permeable cover. Excavated wastes or impacted materials shall be placed first under the low permeability cap areas and if insufficient volume exists in the low permeability area, then waste or impacted materials shall be placed in the low permeability cover areas.

3. Upon completion of excavation of drainage channels and swales, the Contractor shall complete the general soil fill layer using materials excavated from the Site and if not

sufficient, off-site soil borrow supplied by Solutia's off-site soil borrow provider. Construction of the caps and covers will proceed in general by completing the caps and covers in the following order: low permeability caps followed by low permeability covers followed by permanent permeable covers.

4. Complete construction of the caps and covers. Construction of the WTA caps and covers will occur over a multi-year period due to the size of the area being covered and the logistics associated with grading, cover and cap layer installation, and the quantity of off-site soil borrow required. In general, the order of the caps and covers construction shall be:

   Initial Construction - Low permeability cap constructed over the WTA–East and WTA–West soil-bentonite slurry wall area.

   Followed by - Low permeability covers.

   Followed by - Permanent permeable cover over the remainder of the WTA work area.

   The Contractor shall conduct his operations for construction of the caps and covers in such a manner to achieve control of stormwater while avoiding contamination of the vegetative soil cover layer from stormwater runoff from uncapped and uncovered areas of the site. This will require staging of construction such that stormwater runoff from the WTA area during construction will be directed to the Outlet 003 sediment basin. This may require pumping, construction of berms, diversion of stormwater, or other measures to control stormwater runoff. The Contractor shall plan and conduct his construction operations in such a manner as to avoid stormwater runoff flowing from uncapped or uncovered areas over or across areas where geomembrane, composite drainage layer, geotextile, and/or vegetative soil cover has been placed. This requirement has been specified to avoid "contamination" of "clean" layers of the caps and covers from stormwater runoff that has been in contact with impacted materials.

5. The low permeability caps shall be constructed as follows and in accordance with the Drawings and Specifications. The Contractor shall construct the general soil fill layer using materials excavated from the drainage channels and drainage swales in the WTA, and off-site soil borrow material supplied by Solutia's off-site soil borrow provider. The general soil fill layer shall be brought to the proposed subgrade elevations to allow for proper drainage of the cap layers and final surface. The Contractor shall then construct the geotextile cushion, 40-mil HDPE geomembrane, and composite drain layer. The Contractor shall construct cap system underdrains which shall be piped to the stormwater drainage channels and drainage swales. The Contractor shall then construct the vegetative soil cover layer followed by revegetation of the low permeability cap.

6. The low permeability cover shall be constructed next in accordance with the Drawings and Specifications. The Contractor shall construct the general soil fill layer using

materials excavated from the drainage channels and drainage swales in the WTA, and off-site soil borrow material supplied by Solutia's off-site soil borrow provider. The general soil fill layer shall be brought to the proposed subgrade elevations to allow for proper drainage of the cap layers and final surface. Some areas of the WTA to receive the low permeability cover do not require filling to achieve the desired subgrade elevations. The Drawings identify these areas. Work to prepare the surface for the subsequent cover layers includes stripping vegetation from the surface, removal of obstructions and objects which could damage the geosynthetic layers, and smoothing the surface. The Contractor shall then construct the 40-mil HDPE geomembrane, the geotextile, the cap system underdrains (which shall be piped to the stormwater drainage channels and drainage swales), and the vegetative soil cover layer followed by revegetation.

7. The Contractor shall construct the permanent permeable cover over the areas shown on the Drawings and in accordance with the Specifications. The Contractor shall place a layer of geotextile over the prepared subgrade. The subgrade shall be prepared by removing any protruding objects that could damage the geotextile. The subgrade shall be prepared in a smooth and uniform condition. Following placement of the geotextile, the Contractor shall place the vegetative soil cover layer using soil from the off-site borrow source supplied by Solutia's off-site soil borrow provider. The vegetative soil cover layer shall be revegetated.

8. The final activity of construction of the caps and covers at the WTA shall be removal of the Outlet 003 sediment basin. The Outlet 003 sediment basin will be removed after the WTA caps and covers have achieved a "stabilized" condition. The Outlet 003 sediment basin shall be removed by draining water from the basin, covering the surfaces of the basin and sediments accumulated in the berm with geotextile and 18 inches of soil from the off-site soil borrow source supplied by Solutia's off-site soil borrow provider, removal of the sediment basin spillways, and removal of the basin berm. The area shall then be revegetated.

SECTION 1000 – RIVERBANK ARMORING

1.0 SCOPE OF WORK

This section of the Specifications includes, but is not necessarily limited to, supplying all labor, materials, services, and equipment necessary to complete the river armoring activities indicated by the Drawings and Specifications or as requested by the Solutia Representative.

2.0 GENERAL

River Armoring shall include the following:

1. Clearing and grubbing of the right descending bank of the Kanawha River to prepare the riverbank for excavation, geotextile, and rock riprap to be placed as riverbank stabilization. Clearing and grubbing shall include removal of vegetation, stumps, unsuitable material, and any other organic material to allow for the excavation of the riverbank to obtain the proper slope and elevations along the riverbank as shown by the Drawings. Tree tops, branches, tree trunks, brush, and vegetation above the existing ground surface shall be removed from the site and appropriately disposed. Vegetation shall be cut at ground level and removed, chipped, and/or mulched and disposed in a permitted solid waste landfill. This may require obtaining special permission from the West Virginia Department of Environmental Protection, Division of Water and Waste Management because the West Virginia Solid Waste Management Rules prohibit yard wastes from being placed in solid waste landfills. Tree roots and other organic material that has been in contact with soils shall be ground to a mulch and disposed of by mixing with excavated soil and placed under the low permeability caps or low permeability covers. Blending rate of mulch with soil shall not exceed one part mulched wood to one part soil. Clearing and grubbing, and subsequent construction steps up to and including placement of rock riprap, shall be performed behind super silt fence and the floating turbidity control curtain.

2. Preparation of the right descending bank of the Kanawha River to prepare the riverbank for geotextile and rock riprap to be placed as riverbank stabilization for the sections as shown on the Drawings. Super silt fence shall be installed along the waters edge prior to ground disturbance. Excavation shall include removal of, debris, rock, stone, soil, and other materials required to obtain the proper slope and elevations along the riverbank as shown by the Drawings. Excavated materials shall be placed under the low permeability caps (Process Area, Past Disposal Area, Waste Treatment Area – East, and/or Waste Treatment Area – West). In the event that insufficient volume exists beneath the low permeability cap areas, then excavated material may be placed under the low permeability covers within the Process Area and Waste Treatment Area. The Drawings show planned elevations of the general soil fill layer subgrade. Excavated materials from the riverbank shall be placed as general soil fill up to the elevations shown and within the

areas designated to receive the low permeability cap and low permeability cover. The placement of these excavated materials shall be performed such that non-soil materials (stone, pavement, concrete, pavement, debris, etc.) are placed first over the areas to receive general soil fill and that non-soil items are covered with a layer of soil such that the surface of the general soil fill layer is soil. The Contractor may implement size reduction of large debris or shall bury large, bulky debris in the areas to receive general fill. Excavation operations shall be performed from the land and shall be contained completely behind super silt fence and a floating turbidity control curtain.

3. Upon completion of the grading on the riverbank as shown on the Drawings, the Contractor shall place the geotextile fabric over the surface to receive rock riprap. Geotextile shall be overlapped and secured appropriately to resist movement or displacement when riprap is placed. Geotextile shall extend to cover all areas where rock riprap armoring will be placed.

4. Rock riprap shall be placed to the lines, grades, and elevations shown by the Drawings. In general, two riverbank armoring configurations are proposed. From the upriver starting point and extending for a length of approximately 1,485 feet, rock riprap shall be placed in a 24-inch thick layer at a slope of 2.5 horizontal to 1 vertical (2.5H:1V) or less. Rock riprap size is 10-inch well-graded Corp of Engineers (COE) limestone riprap.

   Downriver from this section, the final surface/slope of the rock riprap layer steepens to 2 horizontal to 1 vertical (2H:1V). Rock riprap in this 2H:1V section shall be 15-inch well-graded COE limestone placed in a minimum thickness of 30 inches. Some areas will require a rock riprap thickness in excess of 30 inches to achieve the 2H:1V final surface. This configuration is necessary to avoid impacts to the PDA soil-bentonite slurry wall.

   Cross sections along the riverbank on approximately 50-foot intervals have been surveyed of the existing riverbank configuration and show the lines, grades, and elevations of the riverbank armoring system.

   The Contractor shall have flexibility in the manner of work but shall keep the active sections protected by active erosion and sediment control including super silt fence and turbidity controls at all time. No more than 300 feet of riverbank shall be cleared and grubbed beyond the leading edge of riprap placement at any time and no more than 120 feet shall be excavated beyond the completed riprap armoring at any time. The key section is to be installed in the river on the ledge normally located under water. The ledge is to be cleared of vegetation, rubble, riprap, trash and other items to allow a layer of geotextile to be installed underwater and weighted down. All material from this cleaning action is to be disposed in an approved landfill per the specifications or under the low permeability caps. This key section is to be installed on the existing grade of the river bottom without excavation of the river bottom at the thicknesses shown on the plans using 15-inch Corp of Engineers (COE) riprap and sloped to the finished elevations shown. Riprap is to be installed a minimum of 12 inches thick below normal pool

elevation of 566.0 feet and sloped as shown on the Drawings but in no case not less than 1H:1V beyond that depth to provide protection against wave action. The 2.5H:1V section is to be installed once the bank has been excavated out as shown on the Drawings, generally on a 2.5H:1V slope from Station 0+00 to Station 14+85 as shown on the plans a 24 inch-foot section of 10-inch Corp of Engineers (COE) rated riprap is to be placed on the bank to the top of the bank per the detail. At the top of the riprap the same geotextile being used for the cap and cover is to be installed over the top portion of the riprap and the final 18 inches of cap cover is to be installed and sloped per the drawings. The final cap slope is to be installed so as to maximize the runoff from precipitation to flow away from the riverbank riprap armoring and toward the site. The 2.0H:1V fill section is to be installed once the bank has been excavated out as shown on the plans, generally on a 2.0H:1V slope or steeper from Station 14+85 to Station 23+50 as shown on the Drawings. A 30-inch or more section of 15-inch Corp of Engineers (COE) rated riprap is to be placed on the bank as per the detail to develop a smooth cross section. Care is to be taken in this section to remain a minimum of 25 feet away from the top of the slurry wall. At the top of the riprap the same geotextile being used for the cap and cover is to be installed over the top portion of the riprap and the final 18 inches of cap cover is to be installed and sloped per the drawings. The final cap slope is to be installed so as to maximize the runoff from precipitation to flow away from the river back onto the site. Immediately after sections of the riverbank are armored and final cap is installed, the area is to be raked, fertilized, seeded and strawed.

5. Transition Sections: Transition sections are the areas including the upstream start of an armoring section, a downstream or end of an armoring section or other areas as shown on the Drawings that include outfalls, docks, utilities river crossings, barge mooring facilities or the end of one section and the start of another. The intent of these transition sections is to allow the Kanawha River to flow as smoothly as possible along the bank to minimize disturbance and erosion. Transition Sections include, but are not limited to: (a) beginning Station 0+00; (b) Mooring Piers 1, 2, 3, and 4; (c) dock section; (d) Outfall 001, (e) transition section from 2.5H:1V to 2H:1V; (f) hub pipe outfall; and (g) ending section, Station 23+50. Transition sections as follows shall remain per the existing section and additional riprap added to fill the section as shown on the detail section drawing: Dock Section, Outfall 001, and HUB Pipe outfall.

6. River armoring areas that are disturbed but are not covered with riprap shall be seeded and protected by erosion control straw blankets.

3.0 SUBMITTALS

The Contractor shall submit documentation and evidence of the proper disposal of vegetation removed from above the ground surface on the riverbank including weight tickets from a permitted solid waste disposal landfill. The Contractor shall submit documentation for Floating Turbidity Control Curtain Wall and Super Silt Fence, including material cut sheets and manufacturer's recommended installation instructions. Contractor shall submit product

documentation for the geotextile proposed for use. Contractor shall submit documentation for his source of rock riprap including soundness test results, gradation, etc.

4.0 MATERIALS

4.1 Erosion and Sediment Controls

Erosion and sediment control structures including super silt fence shall meet the requirements of Section 1500 – Storm Water Runoff and Water Management of these Specifications. Erosion and sediment controls shall be installed prior to ground disturbance.

4.2 Floating Turbidity Control Curtain Wall

In addition to the best management practices described by Section 1500 – Storm Water Runoff and Water Management of these Specifications, the Contractor shall provide, install and maintain floating turbidity control curtain wall using PVC floating curtain anchored to the bottom with sufficient flexibility to expand and contract as the river level fluctuates. Type III silt barrier shall have a fabric of heavy duty 22-ounce vinyl coated PVC, barrier shall be high visibility safety yellow, flotation size is normally 8-inch or 12-inch marine quality and is dependent on skirt depth, load carrying components are the base fabric (500x550 lbs tensile ASTM) and dual center tension 5/16-inch galvanized steel cables (18,400 lbs tensile), single 3/8-inch galvanized steel chain (10,400 lbs tensile). The curtain skirt shall be ballasted to hang vertical in the water by a minimum 3/8-inch chain weighing 1.5 lbs per foot. Sections shall easily connect at the waterline via extruded aluminum ASTM bulk connectors with stainless steel toggle pin. Skirts shall connect via overlapped reinforced grommets and chains via shackles. Section ends shall be dual seamed, with bolt-rope reinforcement of a minimum of ¼-inch inch rope. The curtain shall be designed for a river environment with heavy barge traffic. The minimum requirements for the floating turbidity control curtain wall are to remain effective from a minimum elevation of 564.00 to a maximum elevation of 570.00 plus barge wave action. All erosion and sediment controls shall be installed prior to start of ground disturbance. Multiple sections of floating turbidity curtains are to be provided so as to allow the work to progress in an efficient manner by moving a curtain section from a completed section to an area where work has not begun. Minimum steps are erosion and sediment control, clearing and grubbing, excavation to final subgrade, geotextile installation, key riprap section, and river armoring section. A minimum of three active sections are anticipated plus a completed section behind a turbidity section to allow the area behind the turbidity curtain to settle and clear up before the curtain is moved. The Contractor shall have flexibility in the manner of work but shall keep the active sections protected by active erosion and sediment control and turbidity controls at all times. Per the Corp of Engineers permit requirements, no more that 120 feet of riverbank shall be under active excavation and armoring at any one time.

4.3 Riprap

Contractor shall supply Corps of Engineer rated well-graded 10-inch and 15-inch average stone as part of this work for the riverbank riprap armoring. The rock source, method of excavation, loading, delivery to the site, placing of the riprap and finishing shall be submitted and approved prior to start of construction.

Riprap for this project shall consist of commercially supplied stone. Stone used for riprap shall be limestone. The stone shall be nearly rectangular in section as is practicable. The stone shall have a maximum weighted loss of 30 percent when subjected to five cycles of Sodium Sulfate Soundness Test, ASTM C 88 as modified by AASHTO T-104. All stone shall be well-graded and approved by the Owner.

Stone shall be Mulzer 10-inch and Mulzer 15-inch limestone rock as supplied by Mulzer Crushed Stone, Inc. of Tell City, Indiana or Engineer-approved equivalent. COE 15-inch riprap for this project shall have a minimum d50 of 12 inches, a maximum diameter of 15 inches, and a minimum diameter of 6 inches. Pieces smaller than the above minimum size shall not exceed 15 percent by weight. Riprap shall consist of field stone or rough shot rock, and be a hard, durable stone. COE 10-inch riprap for this project shall have a minimum d50 of 8 inches, a maximum diameter of 12 inches, and a minimum diameter of 4 inches. Pieces smaller than the above minimum size shall not exceed 15 percent by weight. Riprap shall consist of field stone or rough shot rock, and be a hard, durable stone.

4.4 Grout Mixes

The grout for grouted riprap areas shown on the plans which may include the transition sections, riprap channels, grouted riprap pipe outlets, and other incidental uses shall consist of a mixture of a minimum one part Portland cement, three parts fine aggregate, and water so proportioned and mixed as to provide a readily pumpable slurry. Admixture and/or a pozzolan may be used with the approval of the Owner. The hardened grout shall exhibit a compressive strength of 2,500 pounds per square inch at 28 days with specimens made and tested according to the provisions of ASTM C 31 and C 39. The Contractor shall submit a mix design to the Engineer for approval prior to ordering or placing grout. Riprap to receive grout shall be wetted immediately prior to placement of grout.

4.5 Geotextile

Geotextile to be placed over the prepared subgrade and under the rock riprap shall be Mirafi® FW500 woven geotextile as manufactured by TenCate Geosynthetics or an Owner approved equal.

The geotextile to be utilized in conjunction with this project shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The geotextile shall be free of any chemical treatment or coating which reduces permeability and shall be inert to chemicals found in the soil and water at the site.

The geotextile shall be in a protective wrapping which shall protect the geotextile from ultraviolet radiation and from abrasion due to shipping and handling. The geotextile shall be installed in locations as shown on the Drawings or as directed by the Owner.

5.0 EXECUTION

5.1 Floating Turbidity Control Curtain Wall

The Contractor shall install and maintain the floating turbidity control curtain wall along the edge of the Kanawha River to prevent the movement of sediments generated/disturbed during riverbank armoring operations from leaving the work area and impacting the river. Contractor shall install and maintain turbidity control curtain wall in accordance with the manufacturer's recommendations and guidelines. No ground disturbance will be allowed without the turbidity control curtain wall (and super silt fence) in place to contain sediments that may result from construction.

It is envisioned that the riverbank stabilization work will proceed in segments. Each segment where work is being performed will be controlled by a floating turbidity control curtain wall. Floating turbidity control curtain wall shall be required prior to clearing and grubbing operations and shall stay in place through placement of rock riprap.

Once construction is complete, floating turbidity control curtain wall shall be completely removed from the site.

5.2 Clearing and Grubbing

Tree tops, branches, tree trunks, brush, and vegetation above the ground surface shall be cut, removed from the site, and appropriately disposed. Vegetation shall be cut just above the ground surface and removed, chipped, and/or mulched and disposed in a permitted solid waste landfill. This may require obtaining special permission from the West Virginia Department of Environmental Protection, Division of Water and Waste Management because the West Virginia Solid Waste Management Rules (33CSR1) prohibit the disposal of yard waste in solid waste landfills.

Tree roots, stumps, and other organic material in contact with soil shall be removed from the riverbank, ground or otherwise processed to form chips or mulch, and then mixed with excavated soils to be placed under the low permeability cap or low permeability cover. Blending rate of mulch to soil shall not exceed one part mulch to one part soil.

5.3 Excavation

Excavation of riverbank soils and debris shall be completed to the lines, grades, and elevations shown on the Drawings. No ground disturbance shall occur until floating turbidty control curtain

wall and super silt fence is in place downgradient of the work area. This project contemplates the excavation of the riverbank soils to slopes as shown on the Drawings to allow a finished riverbank slope ranging from 2 horizontal to 1 vertical (2H:1V) to 2.5 horizontal to 1 vertical (2.5H:1V) in order to obtain a more stable configuration for placement of the rock riprap armoring layer.

Excavation shall comply with Section 1100 – Earthwork of these Specifications.

Excavated materials of any kind shall be placed under the low permeability cap and if insufficient volume is available under the low permeability cap, then excavated materials shall be placed under the low permeability cover.

Excavation/removal of river sediments (material below the normal pool elevation of 566 feet) are not anticipated. Excessive accumulations of sediment which form behind the super silt fence shall be removed and handled the same as excavated soils.

5.4 Unauthorized Excavation

The Contractor shall minimize disturbance of areas beyond the limits of construction shown on the Drawings. In addition, the Contractor shall be responsible for restoration of all areas disturbed by the Contractor or disturbed/impacted as a result of Contractor's operations outside of the limits of construction. The Contractor shall regrade such unauthorized disturbance(s) at its own expense and in conformation with the provisions of this Specification or as otherwise requested by the Solutia Representative or Solutia's Engineer. The Contractor is advised to use caution when working around the Teavee Gas & Oil pipelines and metering station.

5.5 Storage of Materials

All excavated materials shall be stored within the slurry wall areas (areas of the proposed low permeability caps) so as to prevent the excavated materials from being dispersed throughout the site.

5.6 Geotextile Membrane Placement

Geotextile junctions shall overlap a minimum of 2 feet or shall be sewn in accordance with manufacturer's recommendations. The Contractor shall install geotextile in accordance with manufacturer's recommendations. The surface to receive the geotextile shall be prepared to a relatively smooth condition free of large rocks and obstructions, depressions, debris and soft or low density pockets of material. Damaged geotextile or geotextile contaminated or coated with dirt or mud shall not be allowed. Geotextile damaged or displaced before or during installation shall be replaced at the Contractor's expense. Geotextile shall be anchored to the slope sufficient to hold the geotextile in place until the rock riprap layer is in place.

5.7 Riprap Placement

Riprap shall be constructed at locations shown on the Drawings. Riprap shall be required for the riverbank armoring. Riprap shall be installed over the geotextile to the lines, grades, and elevations shown on the Drawings. Riprap placement shall not result in excessive movement or damage of the underlying geotextile. Contractor shall limit drop height of the riprap to no greater than 3 feet above the geotextile. If the Contractor's construction methods result in damage to the geotextile, Contractor shall develop and implement alternate methods of stone placement. Riprap placement shall include preparing the subgrade to receive riprap. The riprap stone shall be firmly bedded on the slopes in such a manner that the individual pieces abut each other to form a layer, the interstices of which are filled with suitable sized spalls. No soil or geotextile should be visible through the riprap when complete. Where specified by the Drawings, riprap shall be grouted to achieve full penetration of the stone layer. Grout shall comply with Section 4.4 of this Specification. The surface of the grouted riprap shall be broom swept to expose the top surface of the riprap. All grouted areas must be coated with a curing compound immediately after completion or shall be kept moist during a three-day curing period.

5.8 Existing Facilities

5.8.1 General

1. Existing subsurface facilities may be encountered during performance of the Work, or located in close proximity to the Work.

2. These facilities may include, but are not necessarily limited to, building foundations, sewers, drains, water mains, gas lines, conduits and their appurtenances. These facilities may not be shown on the Drawings. However, the sizes, locations, and heights or depths (if indicated on the Drawings) are approximate only, and the Contractor shall conduct its operations with caution and satisfy itself as to the accuracy of the information given. The Contractor shall not claim nor shall it be entitled to receive compensation for damages sustained by reason of the inaccuracy of the information given or by reasons of its failure to properly maintain and/or support such structures.

3. The Contractor shall be aware that other subsurface facilities may be present on or in the vicinity of the site area, the existence and/or location of which are not known. Such subsurface facilities may include, but are not necessarily limited to, water and gas services, electric conduits, storm drains, etc. The Contractor shall consult with the Solutia Representative or Solutia's Engineer regarding such facilities and determine, prior to construction, the location and depth of any such facilities that may exist in and around areas to be excavated.

4. If subsurface facilities are known to exist in an area but their location is uncertain, the Contractor shall exercise reasonable care in its excavation technique to avoid damage to the subsurface facilities.

5. The Contractor shall notify Miss Utility of West Virginia prior to the start of the Work. The Contractor is responsible for determining the appropriate amount of time needed to contact Miss Utility in advance of performing excavation activities and for reviewing/protecting facilities identified by Miss Utility.

5.8.2 Notification and Protection Procedures

Except where superseded by state or local regulations or in the absence of any applicable regulations, the Contractor shall, as a minimum, include the following procedures in its operations:

1. Prior to Excavating:

    a. Determine correct field location of all nearby underground facilities to arrange for representatives of the utilities to locate them.
    b. Notify owners of nearby underground facilities when excavating is to take place, allowing them reasonable time to institute precautionary procedures or preventive measures that they deem necessary to protect their facilities.
    c. In cooperation with owners of nearby facilities, provide temporary support and protection of those underground facilities that may be at all vulnerable to damage by virtue of their physical condition or location, or those that could create hazardous conditions if damaged.

2. Immediately notify any utility owner of any damage to its underground facilities resulting from the Contractor's operations, and arrange for repairs to be made as soon as possible.

3. In case of an electrical short, or escape of gas or hazardous fluids (resulting from damage to an underground facility), immediately notify the Solutia Representative, Solutia's Engineer and all persons who might be endangered and assist in evacuation of people from the area.

SECTION 1100 – EARTHWORK

1.0 SCOPE OF WORK

This section of the Specifications includes, but is not necessarily limited to, supplying all labor, materials, services, and equipment necessary to complete the earthwork activities indicated by the Drawings and Specifications or as requested by the Solutia Representative.

2.0 GENERAL

Earthwork shall include the following:

1. Excavation of the right descending bank of the Kanawha River to prepare the riverbank for geotextile and rock riprap to be placed as riverbank stabilization. Excavation shall include removal of vegetation, debris, rock, stone, soil, and other materials required to obtain the proper slope and elevations along the riverbank as shown by the Drawings. Excavated materials shall be placed under the low permeability caps (Process Area, Past Disposal Area, Waste Treatment Area – East, and/or Waste Treatment Area – West). In the event that insufficient volume exists beneath the low permeability cap areas, then excavated material may be placed under the low permeability covers within the Process Area and Waste Treatment Area. The Drawings show planned elevations of the general soil fill layer. Excavated materials from the riverbank shall be placed as general soil fill up to the elevations shown and within the areas designated to receive the low permeability cap and low permeability cover. The placement of these excavated materials shall be performed such that non-soil materials (stone, pavement, concrete, pavement, debris, etc.) are placed first over the areas to receive general soil fill and that non-soil materials are covered with a layer of soil such that the final surface of the general soil fill layer is soil.

2. Excavation of soils, concrete foundations, pavement materials, pipes, aggregate, debris, etc. associated with the construction of the stormwater collection and management system including, but not limited to, corrugated plastic pipe (CPP), drop inlets, drainage channels and swales, sediment basins and ancillary items. Excavated materials shall be placed under the low permeability caps (Process Area, Past Disposal Area, Waste Treatment Area – East, and/or Waste Treatment Area – West). In the event that insufficient volume exists beneath the low permeability cap areas, then excavated material may be placed under the low permeability covers within the Process Area and Waste Treatment Area. The Drawings show planned elevations of the general soil fill layer. Excavated materials from the construction of the stormwater collection and management system shall be placed as general soil fill up to the elevations shown and within the areas designated to receive the low permeability cap and low permeability cover. The placement of these excavated materials shall be performed such that non-soil materials (concrete foundations, pavement materials, pipes, aggregate, debris, etc.) are

placed first over the areas to receive general soil fill and these non-soil items are covered with a layer of soil such that the final surface of the general soil fill layer is soil.

3. Excavation along the top of the riverbank in the southwestern portion of the Process Area planned to generate soil fill and other materials (stone surfacing, pavement, concrete, foundations, etc.) to be used in the general soil fill layer of the caps and covers. Non-soil material (stone, pavement, concrete, piping, etc.) shall be placed on the existing grade in areas to receive general soil fill and covered with soil such that the final surface of the general soil fill layer is soil.

4. Grading as shown on the Drawings is required to result in the proposed general soil fill subgrade elevations. Excavation and fill is required to achieve the proposed elevations of the general soil fill layer. The surface of the general soil fill layer within the Process Area (south of Interstate 64) has been planned to minimize excavation of areas covered by concrete slabs. However, some excavation of paved roadways, concrete slabs, and foundations will be required. Fill shall consist of the materials excavated from the Solutia Nitro property. To the extent that additional soil materials are required to achieve the elevations and grades of the general soil fill layer shown on the Drawings, then the Contractor shall utilize soil from the off-site soil borrow source supplied by Solutia's off-site soil borrow provider as needed.

3.0 SUBMITTALS

As required by the Specifications.

4.0 MATERIALS

4.1 Erosion and Sediment Controls

Erosion and sediment control structures shall meet the requirements of Section 1500 – Stormwater Runoff and Water Management of these Specifications. Erosion and sediment controls shall be installed prior to ground disturbance. In addition, earthwork operations on the riverbank shall require that the floating turbidity control curtain wall be in-place in accordance with the requirements of Section 1000 – Riverbank Armoring of these Specifications.

5.0 EXECUTION

5.1 Unauthorized Excavation

The Contractor shall minimize disturbance of areas beyond the limits of construction shown on the Drawings. In addition, the Contractor shall be responsible for restoration of all areas disturbed by the Contractor or disturbed/impacted as a result of Contractor's operations outside

of the limits of construction. The Contractor shall regrade such unauthorized disturbance(s) at Contractor's own expense and in conformation with the provisions of this Specification or as otherwise requested by the Solutia Representative or Solutia's Engineer.

5.2 Storage of Materials

All excavated materials shall be stored within the slurry wall area (low permeability cap area) or within the low permeability cover area so as to prevent the excavated materials from being dispersed throughout the site.

5.3 Backfill Materials

Soil used as backfill shall consist of materials excavated on the Solutia Nitro property and off-site soil borrow. The intent of this project is to utilize all excavated materials from the site within the general soil fill layer. Excavated soils and other materials generated from the Solutia Nitro property shall be placed as the general soil fill layer within the areas to receive the low permeability caps. In the event that these excavated materials are too excessive to fit entirely within the low permeability cap area, then excavated materials shall be placed as the general soil fill layer within the area to receive the low permeability cover. Soil borrow material will be required to complete the vegetative soil cover layer of this project. Borrow soil shall conform to the Specifications Section 1400 – Borrow Soil and shall be supplied by Solutia's off-site soil borrow provider.

5.4 General Backfilling and Fill Requirements

1. Backfilling and fill shall be started at the lowest section of the area to be backfilled so that fill is placed in an upslope direction only.

2. Drainage controls for the areas being backfilled shall be maintained at all times. An attempt should be made to divert runoff from flowing onto fill areas or ponding in fill areas.

3. Fill shall not be placed in standing water.

4. Backfilling material shall be inspected prior to placement and all roots, vegetation, organic matter, or other foreign debris shall be placed as low as possible in areas to receive the general soil fill layer.

5. Non-soil materials excavated as part of the project shall be placed within or at/near the bottom of the general soil fill layer. Non-soil materials (stone, pavement, concrete, debris, etc.) shall be placed within the general soil fill layer in such a manner that non-soil materials are covered with a layer of "clean" soil with no large particles or objects capable of damaging the overlying geosynthetics.

6. Backfill material shall not be placed when moisture content is too high to allow proper placement and/or compaction.

7. When material is too dry for adequate compaction, water shall be added to the extent necessary.

8. No backfill material shall be placed on frozen ground nor shall the material itself be froze or contain frozen soil fragments when placed.

9. Calcium chloride or other chemicals shall not be added to prevent freezing.

10. Material incorporated in the backfilling operation that is not in satisfactory condition shall be subject to removal and reworking at the Contractor's expense, unless otherwise specified by the Solutia Representative or Solutia's Engineer.

5.5 Method of Compaction

5.5.1 General Compaction

1. The Contractor shall adopt compaction methods that produce the degree of compaction specified herein, prevent subsequent settlement, and provide adequate support.

2. Methods used shall avoid excessive displacement of underlying soils and any damage or disturbance to subsurface piping and/or underlying geosynthetics.

3. Hydraulic compaction by ponding or jetting is not permitted.

4. Backfill material shall not be left in an uncompacted state at the close of a day's construction.

5. Prior to terminating Work, the final layer of compacted fill, after compaction, shall be rolled with a smooth-drum roller, if necessary, to eliminate ridges of soil left by tractors, trucks, or other construction-related equipment.

6. As backfill progresses, the surface shall be graded such that no ponding of water shall occur on the surface of the fill.

7. Fill shall not be placed in snow, ice, or soil that was permitted to freeze prior to compaction.

8. Material placed in the general soil fill layer shall be placed in maximum 12-inch thick loose lifts and each lift compacted to a minimum of 90 percent of the material's maximum dry density, unless the excavated material characteristics will not allow this degree of compaction. It may be necessary to blend or mix excavated materials in order to achieve the specified compaction. The West Virginia Division of Highways'

roller-pass method, MP 700.00.24, latest revision, shall be used to determine the maximum dry density of fill material and the required density of 90 percent. Solutia's on-site representative will provide compaction testing. The Contractor shall assist with the roller pass method by placing fill material in the test lift and subsequent compaction passes until the test concludes.

9. The vegetative soil cover layer shall be lightly compacted. Excessive compactive effort shall be avoided on the vegetative soil cover layer to promote seedbed preparation and to enhance vegetative efforts.

5.5.2 Equipment

1. Generally, equipment used for compaction shall be the largest type in consideration of space limitations of the work areas and the need to protect adjacent facilities and underlying materials.

2. Compaction of fill material in confined areas shall be accomplished by means of a drum-type, power driven, hand-guided vibratory compactor, or by hand-guided vibratory plate tampers unless otherwise indicated by the Drawings.

3. If the proposed method does not give the degree of compaction required, an alternative method shall be adopted until the required compaction is achieved.

5.6 Grading

After completing all fill and backfill operations, the Contractor shall grade the site to the lines, grades, and elevations shown on the Drawings or as otherwise acceptable to the Solutia Representative or Solutia's Engineer, taking into account any subsequent site restoration requirements.

5.7 Existing Facilities

5.7.1 General

1. Existing subsurface facilities may be encountered during performance of the Work, or located in close proximity to the Work.

2. These facilities may include, but are not necessarily limited to building foundations, concrete slabs, pavements, aggregate, impacted materials, sewers, drains, water mains, gas lines, conduits and their appurtenances. These facilities may not be shown on the Drawings. However, the sizes, locations, and heights or depths (if indicated on the Drawings) are approximate only, and the Contractor shall conduct its operations with caution and satisfy itself as to the accuracy of the information given. The Contractor shall not claim nor shall it be entitled to receive compensation for damages sustained by

reason of the inaccuracy of the information given or by reasons of its failure to properly maintain and/or support such structures.

3. The Contractor shall be aware that other subsurface facilities may be present on or in the vicinity of the site area, the existence and/or location of which are not known. Such subsurface facilities may include, but are not necessarily limited to, water and gas services, electric conduits, abandoned piped utilities and conduits, storm drains, etc. The Contractor shall consult with the Solutia Representative or Solutia's Engineer regarding such facilities and determine, prior to construction, the location and depth of any such facilities that may exist in and around areas to be excavated.

4. If subsurface facilities are known to exist in an area but their location is uncertain, the Contractor shall exercise reasonable care in its excavation technique to avoid damage to the subsurface facilities.

5. The Contractor shall notify Miss Utility of West Virginia and the other owners of underground utilities prior to the start of the Work. The Contractor is responsible for determining the appropriate amount of time needed to contact Miss Utility and other utilities in advance of performing excavation activities and for reviewing/protecting facilities identified by Miss Utility.

5.7.2 Notification and Protection Procedures

Except where superseded by state or local regulations or in the absence of any applicable regulations, the Contractor shall, as a minimum, include the following procedures in its operations:

1. Prior to Excavating:
   a. Determine correct field location of all nearby underground facilities to arrange for representatives of the utilities to locate them.
   b. Notify owners of nearby underground facilities when excavating is to take place, allowing them reasonable time to institute precautionary procedures or preventive measures that they deem necessary to protect their facilities.
   c. In cooperation with owners of nearby facilities, provide temporary support and protection of those underground facilities that may be at all vulnerable to damage by virtue of their physical condition or location, or those that could create hazardous conditions if damaged.

2. Immediately notify any utility owner of any damage to its underground facilities resulting from the Contractor's operations, and arrange for repairs to be made as soon as possible.

3. In case of an electrical short, or escape of gas or hazardous fluids (resulting from damage to an underground facility), immediately notify the Solutia Representative, Solutia's Engineer and all persons who might be endangered and assist in evacuation of people from the area.

5.8 Other Requirements

5.8.1 Unfinished Work

When, for any reason, the Work is to be left unfinished, all excavations, shall be filled and all roadways and watercourses left unobstructed with their surfaces in a safe and satisfactory condition.

5.8.2 Hauling Material on Public Roadways

1. When hauling material over the public roadways, the Contractor shall provide suitably tight vehicles so as to prevent material spillage onto public and private right of ways. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep crosswalks, streets, and pavements clean and free from dirt, mud, stone, and other hauled material. Related activities shall be coordinated with the Solutia Representative or Solutia's Engineer.

2. When hauling materials that may contain hazardous constituents, the Contractor shall abide by all applicable federal, state, and local codes, including, but not limited to, manifesting and placarding (if necessary). Related activities shall be coordinated with the Solutia Representative or Solutia's Engineer.

5.8.3 Dust Control

It shall be the sole responsibility of the Contractor to control dust created by any and all of its operations to such a degree that it will not endanger the safety and welfare of the general public and site workers or be a nuisance to the public and site workers. Related activities shall be performed in accordance with applicable Occupational Safety and Health Administration (OSHA) standards, and the Contractor's Operations Plan.

The Contractor shall be responsible for controlling dust from areas contained within the project work limits. Dust control will be required for worker health and safety, to avoid nuisance dust impacts off-site, and to avoid contamination of clean surfaces installed by the Contractor as part of the final caps and covers. No visible dust shall be allowed. The Contractor shall implement measures and procedures to avoid and control fugitive dust. This shall include phasing of construction operations, minimizing traffic over work areas, application of water or other Solutia-approved dust suppressants, or other appropriate measures.

The Contractor is cautioned that dust from his operations could impact clean layers installed as part of the final caps and covers. The Contractor will be responsible for remedying contamination of clean layers caused by Contractor's failure to properly manage its Work to prevent such contamination.

SECTION 1300 – SEEDING AND MULCHING

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for furnishing and placement of fertilizer, seed, mulch and maintenance of seeded areas until final acceptance by Solutia. All areas disturbed by the Contractor not covered by riprap or stone shall be revegetated. Revegetated areas shall include the 18-inch vegetative soil cover layer of each cap or cover and areas disturbed incidental to construction of caps, covers, and riverbank stabilization.

2.0 SUBMITTALS

The Contractor shall submit the following information to the Solutia Representative or Solutia's Engineer for review prior to the start of construction.

The Contractor shall submit analysis of the seed (to demonstrate compliance with the seed mix identified in Section 3.3 of this specification) and fertilizer (to identify chemical composition); and proposed application rates (to demonstrate compliance with the fertilizer application rate identified in Section 3.1 of this specifications).

Should hydro seed be used, the Contractor shall submit all data including equipment type, material and application rate.

Should the Contractor elect to utilize soil samples to determine lime application rates, the frequency of soil samples shall be one test per 10 acres of area to be revegetated. The locations of soil samples will be distributed evenly across the area to be revegetated with the locations approved by Solutia's Engineer. Lime application rate test results shall be submitted to the Solutia Representative for approval.

3.0 MATERIALS

3.1 Fertilizer

Fertilizer shall be a standard quality commercial carrier of available plant food elements. A complete prepared and packaged material shall contain a minimum of 10 percent nitrogen, 20 percent phosphoric acid and 20 percent potash, unless otherwise allowed by the Solutia Representative or Solutia's Engineer. The commercial fertilizer shall be furnished in standard containers. These containers, in accordance with applicable state and federal laws, must be clearly marked with the following information

1. Weight

2. Name of Plant Nutrients
3. Guaranteed Nutrients Percentages

Fertilizer shall be applied at a minimum rate of 1,000 lbs/acre. Fertilizer shall be applied immediately to all areas reaching final grade by one of the two following methods:

1. Apply and incorporate fertilizer during seedbed preparation.
2. Apply fertilizer in hydro seeding mixture following seedbed preparation.

3.2 Limestone

The lime to be used will be an agricultural grade pulverized limestone containing a minimum of 10 percent $MgCO_3$ and not less than 75 percent total carbonates. Fineness will be such that no less than 75 percent will pass through a #100 sieve and 100 percent will pass through a #10 sieve.

Lime rate shall be formulated from soil test results. In the absence of soil testing, a rate of 5 tons per acre will serve as the preferred minimum. Lime shall be applied immediately to all areas requiring seeding reaching final grade by one of the two methods listed in Section 3.1 of this Specification.

3.3 Seed

Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix.

3.3.1 Temporary Seed Mixture

Disturbed areas which will require further disturbance in which the additional disturbance will be delayed for a period of three (3) weeks or longer shall be vegetated according to the following guidelines.

Variety of Seed	Spring 3/15–5/15	Summer 5/31–8/15	Fall 8/15–10/15	Winter 10/15–11/15
	Pounds/Acre			
Annual Ryegrass (Lolium multiflorum)	20		20	
German Millet* (Setaria italica)		50		
Cereal Rye (Secale cereale)			90	

* *Do not use Japanese Millet.*

All areas to be temporarily seeded which are to be redisturbed shall be fertilized with 500 lbs/acre of fertilizer in accordance with Section 3.1 of this Specification. All areas reaching final grade to be temporarily seeded shall be fertilized according to Section 3.1 of this

Specification. Lime shall be applied according to Section 3.2 and mulched according to Section 3.4 of this Specification. Permanent seed mixture may be substituted for temporary seed mixture according to Section 3.3.2 of this Specification provided that it is approved by the Solutia Representative or Solutia's Engineer and provided that any area failing to establish a vegetative stand shall be reseeded, relimed, refertilized and remulched as approved by the Solutia Representative or Solutia's Engineer.

3.3.2 Permanent Seed Mixture

Permanent vegetation shall be established on all areas reaching final grade or other areas not likely to be disturbed/destroyed by further construction activities. Any areas which reach final grade between May 31 – August 15 or October 15 – November 15 shall be seeded with the appropriate temporary seed mixture according to Section 3.2.1 of this Specification unless seeded with the permanent seed mixture under the provisions stipulated in Section 3.3.1 of this Specification. These areas shall then be reseeded with a permanent seed mixture, without Annual Ryegrass, during the next defined seeding period according to this section. The actual date of permanent seeding will require Solutia's Engineer's approval.

Variety of Seed*	Spring 3/15–5/15	Fall 8/15–10/15
	Pounds/Acre	
Orchardgrass (Dactylis glomerata)	20	20
Birdsfoot Trefoil[(1)] (Lotus corniculatus)	15	15
Red Clover (Trifolium pretense)	15	15
Annual Ryegrass[(2)] (Lolium multiflorum)	20	20
Rye Grain or Winter Wheat	30 0	0 30

(1) Herbaceous legumes must be treated with the appropriate bacterium before seeding. On areas which are steeply sloping (steeper than 1.7:1) or slide prone, substitute Crownvetch (Coronilla varia) at 20 lbs./acre for Birdsfoot Trefoil.

(2) Use Annual Ryegrass only in mixtures seeded after August 1 and before May 1.

* *Use only certified "blue tag" seed. Seed-rate suggested is for pure live seed (PLS) in lbs/acre.*

3.4 Mulch

Mulching procedures shall take place immediately following seeding. Mulch material shall consist of erosion matting, straw, or wood cellulose fiber.

3.4.1 Straw

Straw mulch shall include baled wheat or oats straw. Straw mulch shall be dry and reasonably free of weed, seeds, sticks, or other foreign material. Straw mulch shall be applied at a rate of 2 tons/acre. The straw mulch shall be anchored with 750 pounds/acre wood cellulose fiber or other environmentally acceptable material with prior approval of Solutia. Please note that baled grass hay will not be allowed as mulch for seeding lawn areas.

Straw mulch shall be used on all areas of the final caps and covers and shall be used on areas having a slope of less than 2 horizontal to 1 vertical (2H:1V).

3.4.2 Wood Cellulose Fiber

Wood cellulose fiber may be used only on slopes steeper than 2H:1V at a rate of 1,500 lbs/acre. Mulch for use with the hydraulic application of seed, fertilizer, and lime shall consist of wood cellulose fiber. It shall be processed in such a manner that it will contain no growth or germination inhibiting factors and shall be dyed green. It shall be manufactured in such a manner that (1) after addition and agitation in slurry tanks with fertilizers, lime seeds, and water, the fibers in the material will become uniformly suspended to form a homogeneous slurry and (2) the material, when hydraulically sprayed on the ground, will form a blotter-like ground cover impregnated uniformly with seed, will allow rainfall to percolate to the underlying soil. Wood cellulose shall only be used on areas that have been approved by the Solutia Representative or Solutia's Engineer.

The wood cellulose fiber shall be supplied in packages having a gross weight not to exceed 100 pounds. Weight specifications of this material from suppliers, and for all applications, shall refer only to air dry weight of the fiber material. Air dry weight is based on the normal weight standard of the Technical Association of the Pulp and Paper Industry for Wood Cellulose and is considered equivalent to 10 percent moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content.

3.5 Water

Water shall be reasonably free of injurious and other toxic substances harmful to plant life. The source of water is subject to the approval of the Solutia Representative or Solutia's Engineer.

4.0 INSTALLATION

4.1 All revegetation activities shall be conducted immediately following completion of final grading so as to utilize the fine soil material as a seedbed before this material is lost via subsequent rainfall and/or erosion.

4.2 The fertilizer and lime shall be applied to the surface uniformly at the predetermined rate.

4.3 On sites where appropriate equipment can operate the seedbed shall be prepared by breaking up surface crusts and loosening the soil material to a minimum of 3 inches. Disking, harrowing, cultipacking or other acceptable tillage operations may be used to prepare the seedbed. On sites where appropriate equipment cannot operate, the seedbed shall be prepared by "tracking in" with a low ground pressure dozer or scarifying by other approved methods. Rocks larger than 4 inches in diameter, trash, weeds and other debris that will interfere with seeding or maintenance shall be removed or disposed of as approved by the Solutia Representative or Solutia's Engineer. Seedbed preparation shall be suspended when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the Solutia Representative or Solutia's Engineer.

4.4 After the seedbed has been prepared, the seed mixture shall be uniformly applied upon the prepared surface by manual spreading or hydro seeding as approved by the Solutia Representative or Solutia's Engineer.

4.5 The mulch shall be hand or machine spread to form a continuous blanket over the seed bed. Excessive amounts or bunching of mulch shall not be permitted. Unless otherwise specified, mulch shall be left in place and allowed to decompose.

4.6 Seeded areas shall be watered as often as required to obtain germination, and to obtain and maintain a satisfactory sod growth. Watering shall be performed in such a manner as to prevent washing out of seed and mulch.

5.0 MAINTENANCE

All erosion rills or gullies that may form within the vegetative soil layer as a result of runoff shall be filled with acceptable soil and graded smooth, and reseeded and mulched in accordance with this section.

The Contractor will be responsible for repairs to all erosion of the seeded areas until all new grass is firmly established and reaches a height of not less than 4 inches. All bare or poorly vegetated areas must be reseeded and mulched in accordance with this section.

6.0 CRITERIA FOR ACCEPTANCE

Vegetation will be evaluated at the end of the one year warranty period to determine if the growth established during this period is acceptable. The Solutia Representative or Solutia's Engineer will meet with the Contractor prior to the end of the warranty period and review the Work areas completed with vegetative cover. Acceptable growth will be determined based on visual assessment of the vegetated areas. Criteria considered during this assessment will include evidence of stressed vegetation, areas lacking in vegetation, clumped growth and average stem density. In general, stem density will be considered acceptable if the density is viewed as being 80 percent or greater.

Areas failing to demonstrate acceptable growth of vegetation as defined above will be reseeded by the Contractor at no additional cost to Solutia. Reseeding shall include the application of lime, fertilizer, seed and mulch at the originally-specified rates. Reseeding shall also include repairs to washouts and/or gullies, and appropriate seedbed preparation as specified herein.

SECTION 1400 – OFF-SITE BORROW SOIL

1.0 SCOPE OF WORK

This section of the Specifications includes, but is not necessarily limited to, requirements for the off-site soil borrow required for the Final Caps and Covers Installation Work. Solutia will contract with a third-party to supply all labor, materials, services and equipment necessary for excavating, loading, transporting, and dumping soil at the Work area or into clean soil stockpiles at the Solutia Nitro property. Soil materials are required for construction of the 18-inch vegetative soil cover layer of the various caps and covers; and other miscellaneous construction associated with the caps and covers work as shown by the Drawings or as directed by the Solutia Representative or Solutia's Engineer. Soil from off-site borrow sources will be required for the clean soil to be incorporated into the final caps and covers work. Soil shall be free from contaminants when used in the 18-inch vegetative soil cover layer to avoid concerns with post-capping and cover storm water runoff quality. Off-site borrow soil shall be free from contaminants regardless of where it is utilized on the Solutia Nitro property.

2.0 GENERAL

Soil from an off-site borrow source will be required for the landfill caps and covers. Solutia will provide off-site soil borrow material under a separate contract with a third-party provider (Solutia's off-site soil borrow provider). The Contractor shall coordinate work with Solutia's off-site soil borrow provider in order to receive shipments of off-site soil borrow, stockpiling of soil, transporting soil from stockpiles to the site of Work, spreading, compaction, and finish grading. Solutia's off-site soil provider can dump soil near the active work location when conditions and the schedule of Contractor and Solutia's off-site soil borrow provider allows. Otherwise, Solutia's off-site soil provider will place off-site borrow into designated stockpile locations. Excavated soils from on-site shall be used in the general soil fill layer. Off-site borrow soil (only) will be required for the 18-inch vegetative soil cover layer of the low permeability cap, low permeability cover, and permanent permeable cover. Off-site borrow soil shall also be required as clean backfill above the corrugated plastic stormwater drainage pipe.

Solutia will obtain representative soil samples from each off-site soil borrow source, have samples analyzed, and review results to determine acceptability for use prior to having the soil delivered to the site.

3.0 SUBMITTALS

The following information will be reviewed and approved by the Solutia Representative or Solutia's Engineer, prior to importing soil borrow fill material to the site:

1. Name and address of each source and type of soil borrow fill material proposed for use, as well as an estimate of the quantity of soil to be supplied from each borrow source.

2. For each source of soil borrow fill material, a due diligence environmental database search for land use history. This search shall produce satisfactory results in order for the source to be considered for use as a borrow site. Solutia will be the final authority on the acceptability of a potential borrow source when considering the database search results.

3. Analytical results corresponding to each type of soil borrow material, from each source. Solutia will obtain samples, contract with a laboratory, and review analytical results for each soil sample prior to delivering soil to the site. Sampling and analytical testing frequency for soil borrow shall be a minimum of one test per borrow source and one test for each 10,000 cubic yards of soil imported from each borrow source. Each sample shall be analyzed for:

   a. Volatile Organic Compounds (VOCs), Method 8260B, Protocol SW846
   b. Organochlorine Pesticides and PCBs, Method 8081A_8082, Protocol SW846
   c. Herbicides, Method 8151A, Protocol SW846
   d. Metals, Method 6020, Protocol SW846
   e. Dioxin (2,3,7,8-TCDD), Method EPA-5, 1613B

   Samples will be analyzed and reported on a dry weight basis. Solutia's approved laboratory is TestAmerica Laboratories, Inc., TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, Georgia 31404. Laboratory results will be provided in a laboratory data package including case narrative, chain of custody, table of contents, qualifier codes, raw data, and summary forms. Laboratory results shall be promptly submitted to and reviewed by Solutia as results become available.

   Analytical results for soil borrow samples will be reviewed by Solutia and compared to Table 1400.1 to determine the acceptability of the borrow source. Analytical results should be non-detect at the method detection limits, below natural background levels, or below the industrial risk-based concentrations (RBCs) as contained in Table 1400.1 to be considered acceptable for use on the Nitro property.

TABLE 1400.1
Industrial Risk-Based Concentrations for Screening of Off-site Soil Borrow Sources

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
METALS			
Antimony	7440-36-0	820	mg/kg[3]
Arsenic	7440-38-2	27	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
Barium	7440-39-3	290000	mg/kg
Beryllium	7440-41-7	3700	mg/kg
Cadmium	7440-43-9	1000	mg/kg
Chromium	18540-29-9	4500	mg/kg
Copper	7440-50-8	82000	mg/kg
Lead	7439-92-1	1000	mg/kg
Mercury	7439-97-6	610	mg/kg
Nickel	7440-02-0	41000	mg/kg
Selenium	7782-49-2	10000	mg/kg
Silver	7440-22-4	10000	mg/kg
Thallium	7440-28-0	160	mg/kg
Zinc	7440-66-6	610000	mg/kg
POLYCHLORINATED BIPHENYLS			
Aroclor (Total)	NE[3]	10	mg/kg
Aroclor-1016	12674-11-2	50	mg/kg
Aroclor-1221	11104-28-2	10	mg/kg
Aroclor-1232	11141-16-5	10	mg/kg
Aroclor-1242	53469-21-9	10	mg/kg
Aroclor-1248	12672-29-6	10	mg/kg
Aroclor-1254	11097-69-1	10	mg/kg
Aroclor-1260	11096-82-5	10	mg/kg
PESTICIDES			
Aldrin	309-00-2	1.5	mg/kg
alpha-BHC	319-84-6	5.9	mg/kg
beta-BHC	319-85-7	21	mg/kg
Chlordane	57-74-9	110	mg/kg
Dieldrin	60-57-1	1.5	mg/kg
Endosulfan I	959-98-8	5300	mg/kg
Endosulfan II	33213-65-9	5300	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
Endrin	72-20-8	260	mg/kg
gamma-BHC	58-89-9	29	mg/kg
Heptachlor	76-44-8	5.5	mg/kg
Heptachlor Epoxide	1024-57-3	2.7	mg/kg
Methoxychlor	72-43-5	4400	mg/kg
p,p'-DDD	72-54-8	170	mg/kg
p,p'-DDE	72-55-9	120	mg/kg
p,p'-DDT	50-29-3	120	mg/kg
Toxaphene	8001-35-2	22	mg/kg
HERBICIDES			
2,4-D	94-75-7	12000	mg/kg
2,4-DB	94-82-6	7000	mg/kg
2,4,5-T	93-76-5	8800	mg/kg
2,4,5-TP	93-72-1	7000	mg/kg
Dalapon	75-99-0	26000	mg/kg
Dicamba	1918-00-9	26000	mg/kg
Dinoseb	88-85-7	880	mg/kg
MCPA	94-74-6	440	mg/kg
SEMIVOLATILE ORGANIC COMPOUNDS			
1,1'-Biphenyl	92-52-4	30000	mg/kg
1,2-Dichlorobenzene	95-50-1	150	mg/kg
1,3-Dichlorobenzene	541-73-1	130	mg/kg
1,4-Dichlorobenzene	106-46-7	45	mg/kg
1,2,4,5-Tetrachlorobenzene	95-94-3	260	mg/kg
1,2,4-Trichlorobenzene	120-82-1	20000	mg/kg
1,2-Diphenylhydrazine	122-66-7	31	mg/kg
2,3,4,6-Tetrachlorophenol	26000	26000	mg/kg
2,4,5-Trichlorophenol	95-95-4	88000	mg/kg
2,4,6-Trichlorophenol	88-06-2	2200	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
2,4-Dichlorophenol	120-83-2	2600	mg/kg
2,4-Dimethylphenol	105-67-9	18000	mg/kg
2,4-Dinitrophenol	51-28-5	1800	mg/kg
2,4-Dinitrotoluene	121-14-2	1800	mg/kg
2,6-Dinitrotoluene	606-20-2	890	mg/kg
2-Chlorophenol	95-57-8	240	mg/kg
2-Methylphenol	95-48-7	44000	mg/kg
2-Nitroaniline	88-74-4	2600	mg/kg
3&4-Methylphenol	106-44-5	4400	mg/kg
3,3'-Dichlorobenzidine	91-94-1	55	mg/kg
4-Chloroaniline	106-47-8	3500	mg/kg
4-Nitrophenol	100-02-7	7000	mg/kg
Acenaphthene	83-32-9	38000	mg/kg
Acenaphthylene	208-96-8	44000	mg/kg
Acetophenone	98-86-2	25000	mg/kg
Anthracene	120-12-7	390000	mg/kg
Atrazine	1912-24-9	110	mg/kg
Benzaldehyde	100-52-7	1700	mg/kg
Benzidine	92-87-5	0.11	mg/kg
Benzo[a]anthracene	56-55-3	29	mg/kg
Benzo[a]pyrene	50-32-8	2.9	mg/kg
Benzo[b]fluoranthene	205-99-2	29	mg/kg
Benzo[g,h,i]perylene	191-24-2	23000	mg/kg
Benzo[k]fluoranthene	207-08-9	290	mg/kg
bis(2-Chloroethyl)ether	111-44-4	6	mg/kg
bis(2-Chloroisopropyl)ether	108-60-1	81	mg/kg
bis(2-Ethylhexyl)phthalate	117-81-7	1800	mg/kg
Butylbenzylphthalate	85-68-7	180000	mg/kg
Caprolactam	105-60-2	440000	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
Carbazole	86-74-8	1200	mg/kg
Chrysene	218-01-9	2900	mg/kg
Dibenzo[a,h]anthracene	53-70-3	2.9	mg/kg
Dibenzofuran	132-64-9	2000	mg/kg
Diethylphthalate	84-66-2	700000	mg/kg
Dimethylphthalate	131-11-3	1000000	mg/kg
Di-n-butylphthalate	84-74-2	88000	mg/kg
Fluoranthene	206-44-0	30000	mg/kg
Fluorene	86-73-7	33000	mg/kg
Hexachlorobenzene	118-74-1	15	mg/kg
Hexachlorobutadiene	87-68-3	320	mg/kg
Hexachlorocyclopentadiene	77-47-4	5200	mg/kg
Hexachloroethane	67-72-1	880	mg/kg
Indeno[1,2,3-cd]pyrene	193-39-5	29	mg/kg
Isophorone	78-59-1	26000	mg/kg
Naphthalene	91-20-3	190	mg/kg
Nitrobenzene	98-95-3	110	mg/kg
N-Nitrosodimethylamine	62-75-9	0.48	mg/kg
N-Nitroso-di-n-propylamine	621-64-7	3.5	mg/kg
N-Nitrosodiphenylamine	86-30-6	5000	mg/kg
Pentachlorophenol	87-86-5	110	mg/kg
Phenanthrene	85-01-8	410000	mg/kg
Phenol	108-95-2	260000	mg/kg
Pyrene	129-00-0	54000	mg/kg
VOLATILE ORGANIC COMPOUNDS			
1,1,1-Trichloroethane	71-55-6	710	mg/kg
1,1,1,2-Tetrachloroethane	630-20-6	71	mg/kg
1,1,2,2-Tetrachloroethane	79-34-5	9	mg/kg
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	2600	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
1,1,2-Trichloroethane	79-00-5	19	mg/kg
1,1-Dichloroethane	75-34-3	1600	mg/kg
1,1-Dichloroethene	75-35-4	430	mg/kg
1,2,3-Trichloropropane	96-18-4	11	mg/kg
1,2,4-Trichlorobenzene	120-82-1	20000	mg/kg
1,2-Dibromo-3-chloropropane	96-12-8	71	mg/kg
1,2-Dibromoethane	106-93-4	0.62	mg/kg
1,2-Dichlorobenzene	95-50-1	150	mg/kg
1,2-Dichloroethane	107-06-2	7.7	mg/kg
1,2-Dichloropropane	78-87-5	14	mg/kg
1,3-Dichlorobenzene	541-73-1	130	mg/kg
1,3,5-Trimethylbenzene	108-67-8	70	mg/kg
1,4-Dichlorobenzene	106-46-7	45	mg/kg
1,4-Dioxane	123-91-1	2200	mg/kg
2-Chlorotoluene	95-49-8	250	mg/kg
Acetone	67-64-1	56000	mg/kg
Acrolein	107-02-8	0.34	mg/kg
Benzene	71-43-2	15	mg/kg
Bromodichloromethane	75-27-4	24	mg/kg
Bromoform	75-25-2	3100	mg/kg
Bromomethane	74-83-9	13	mg/kg
n-Butylbenzene	104-51-8	82	mg/kg
sec-Butylbenzene	135-98-8	78	mg/kg
Carbon disulfide	75-15-0	470	mg/kg
Carbon tetrachloride	56-23-5	5.3	mg/kg
Chlorobenzene	108-90-7	310	mg/kg
Chloroethane	75-00-3	65	mg/kg
Chloroform	67-66-3	5.2	mg/kg
Chloromethane	74-87-3	160	mg/kg

Target Analytes	CAS[1] Number	Industrial RBC[2]	Units
cis-1,2-Dichloroethene	156-59-2	150	mg/kg
Cyclohexane	110-82-7	68	mg/kg
Dibromochloromethane	124-48-1	680	mg/kg
Dibromomethane	74-95-3	240	mg/kg
Dichlorodifluoromethane	75-71-8	190	mg/kg
Ethylbenzene	100-41-4	110	mg/kg
Hexachlorobutadiene	87-68-3	320	mg/kg
Methyl Acetate	79-20-9	96000	mg/kg
Methylcyclohexane	108-87-2	85	mg/kg
Methylene chloride	75-09-2	210	mg/kg
Methyl-t-butyl ether	1634-04-4	11000	mg/kg
n-Propylbenzene	103-65-1	20000	mg/kg
Styrene	100-42-5	630	mg/kg
tert-Butylbenzene	98-06-6	140	mg/kg
Tetrachloroethene	127-18-4	19	mg/kg
Toluene	108-88-3	260	mg/kg
trans-1,2-Dichloroethene	156-60-5	180	mg/kg
Trichloroethene	79-01-6	0.92	mg/kg
Trichlorofluoromethane	75-69-4	950	mg/kg
Vinyl chloride	75-01-4	8.8	mg/kg
m&p-Xylenes	1330-20-7	100	mg/kg
o-Xylene	95-47-6	100	mg/kg
Xylenes (Total)	1330-20-7	100	mg/kg
DIOXINS			
2,3,7,8-TCDD	1746-01-6	0.0000039	0.00027

Notes:

1. CAS = Chemical Abstract Service
2. Industrial Risk-Based Concentrations (RBCs) from West Virginia Voluntary Remediation and Redevelopment Rule 60 CSR 3, Table 60 -3B
3. mg/kg = milligrams per kilogram. All values to be reported as dry weight.

If such testing indicates unacceptable chemical characteristics, Solutia's Engineer will reject the use of soil borrow materials from the proposed source(s), and Solutia will identify and obtain an alternate soil borrow source along with the necessary soil analytical results and corresponding source information as required by this section of the Specifications.

The selection of a source or sources for the soil borrow material is the sole responsibility of Solutia.

4. Soil proposed for use in the 18-inch vegetative soil cover layer shall be suitable for supporting/sustaining vegetation as specified in these Specifications. Each sample obtained as described above will also be subjected to soil pH, lime requirements, and nutrients analysis and recommended lime and fertilizer application rates will be determined using the results of these analyses.

4.0 MATERIALS

Soil borrow material shall be suitable for incorporation in the 18-inch vegetative soil cover layer. Soil shall have a proper moisture content to allow for spreading in the 18-inch thick soil cover layer while supporting the construction equipment and avoiding damage to the underlying geosynthetic layers.

Soil borrow material shall be of suitable character to support vegetation including appropriate particle size, consistency, and composition. Soil pH, lime requirements, and nutrients analysis shall be used to formulate the necessary lime and fertilizer application rates.

Soil for the general soil fill layer shall be capable of being placed in 12-inch maximum loose lifts and compacted to a minimum of 90 percent of the maximum dry density as determined by the West Virginia Division of Highways' roller-pass method without excessive pumping or movement.

Soil shall be free of vegetative growth, woody debris, rocks or clods larger than 4 inches, debris, and other objectionable material.

Solutia reserves the right to reject loads of soil from previously-approved sources if the soil does not meet the required properties and characteristics required in the Specifications.

5.0 INSTALLATION

Requirements for placement of borrow soil are covered in other sections of these Specifications including:

- Section 1100 - Earthwork
- Section 2000 - Low Permeability Cap
- Section 2010 - Low Permeability Cover
- Section 2020 - Permanent Permeable Cover

SECTION 1500 – STORMWATER RUNOFF AND WATER MANAGEMENT

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for stormwater runoff and water management as indicated on the Drawings and as hereinafter specified. The management of stormwater during and following construction will include implementation of Best Management Practices (BMPs) in order to provide for both erosion and sediment control. BMPs for this project will include construction and operation of sediment basins in the Process Area (PA) and Waste Treatment Area (WTA). Other BMPs proposed for use or that may be used include silt fence, super silt fence, rock ditch checks, erosion control matting, and vegetative cover. The work consists of furnishing all labor, equipment, materials, tools, and services necessary to implement and maintain controls to intercept and treat stormwater such that the site discharge is in compliance with the applicable NPDES effluent limits and requirements. The stormwater control measures are intended to control site stormwater runoff throughout the construction of the final caps and covers installation. The Contractor shall provide erosion and sediment control as needed to control stormwater from all areas of the site.

2.0 GENERAL

Solutia is managing stormwater from the Nitro property under a NPDES permit. The West Virginia Department of Environmental Protection (WVDEP) has issued a permit with the following effluent benchmarks as contained in Table 1500.1. These benchmarks will serve as the required effluent limits for this Work.

TABLE 1500.1
Solutia Effluent Benchmarks for Stormwater Discharged from the Nitro Site

Pollutant	Benchmark Value
Chemical Oxygen Demand	120 mg/L
Total Suspended Solids	100 mg/L
Biochemical Oxygen Demand	30 mg/L
pH	6.0 to 9.0 S.U.
Dioxin	0.014 pg/L
Arsenic, Total Recoverable	0.15 mg/L
Iron, Total Recoverable	1 mg/L
Selenium, Total Recoverable	0.005 mg/L
Beryllium, Total Recoverable	0.13 mg/L

Pollutant	Benchmark Value
Zinc, Total Recoverable	0.117 mg/L
Aluminum, Total Recoverable	0.75 mg/L
Cadmium, Total Recoverable	0.0021 mg/L
Lead, Total Recoverable	0.0816 mg/L
Copper, Total Recoverable	0.014 mg/L
Carbon Tetrachloride	4.4 ug/L
1,2-Dichloroethane	0.099 mg/L
Toluene	10 mg/L
Benzene	0.01 mg/L
Chlorobenzene	21 mg/L
Tetrachloroethylene	0.081 mg/L
1,1,2,2-Tetrachloroethane	0.011 mg/L
1,2-Dichlorobenzene	17 mg/L
1,3-Dichlorobenzene	2.6 mg/L
1,4-Dichlorobenzene	2.6 mg/L
2-Chlorophenol	0.4 mg/L
2,4-Dichlorophenol	0.79 mg/L
2,4,6-Trichlorophenol	6.5 ug/L
Ethyl Benzene	29 mg/L
Pentachlorophenol	8.2 ug/L
Vinyl Chloride	0.525 mg/L
Trichloroethylene	0.0027 mg/L
Hexachlorobenzene	0.00077 ug/L
Mercury	0.0014 mg/L
Chromium, Hexavalent	0.011 mg/L
2-Chloronaphthalene	1.6 mg/L

The Contractor shall develop, implement, maintain and modify stormwater control best management practices (BMPs) in order to meet the above benchmarks for stormwater runoff flowing from the Contractor's work areas. The Drawings show the following BMPs which shall be utilized during construction in order to treat stormwater runoff.

Process Area

Surface runoff from the Process Area (PA) presently drains to the Kanawha River through existing WV/NPDES Permit Outlet 001. Surface runoff from the WVABCA parcel presently drains to the Kanawha River through the HUB Industrial Park drainage pipe. Runoff from the areas to be capped and covered shall be managed using BMPs as described below.

- A floating turbidity control wall curtain and super silt fence shall be utilized to control sediments generated during excavation of the riverbank and placement of geotextile and riprap for bank stabilization work. The specifications for the floating turbidity control wall curtain are addressed in Section 1000 – River Armoring of these Specifications.

- The Contractor shall enlarge the existing pond at Outlet 001 in order to provide an enlarged sediment basin to control runoff from the caps and covers construction activities. Runoff from the process area shall be directed to the Outlet 001 sediment basin prior to discharge to the Kanawha River through existing Outlet 001.

- The Contractor shall install silt fence at locations shown on the Erosion and Sediment Control Plan (Drawings) to control sediments during construction and until such time as the site is stabilized. This will include installing and maintaining silt fence along the existing perimeter fencing at the edge of the Solutia Nitro property.

- The Contractor shall install drop inlet protection devices around each drop inlet installed as part of the surface runoff control systems.

- The Contractor shall utilize prompt revegetation (seeding and mulching) of completed areas as each area is brought to final grade. Seeding and mulching of the completed caps and covers shall be performed in accordance with Section 1300 – Seeding and Mulching of these Specifications.

- Drainage channels (i.e., the West Virginia Alcohol Beverage Control Administration (WVABCA) drainage swale) shall be lined with erosion control matting. Erosion control matting shall be in accordance with Section 1700 – Surface Runoff Control System of these Specifications.

- The Contractor shall install and maintain stabilized construction entrances to control tracking of sediments onto public roadways.

Waste Treatment Area

Surface runoff from the Waste Treatment Area (WTA) presently drains from the Solutia property to the Kanawha River through existing WV/NPDES Permit Outlets 002 and 003, and by sheet

flow. During and following construction of the caps and covers, the majority of stormwater runoff from the WTA will be directed toward Outlet 003, although some runoff will continue to be directed to Outlet 002 and to the Kanawha River via sheet flow. Runoff from the areas disturbed by cap and cover construction shall be managed using BMPs as described below.

- The Contractor shall construct and operate a sediment basin in the A-3 basin drainage channel. This sediment basin will discharge to existing WV/NPDES Outlet 003. The sediment basin will require that an earthen berm, principal spillway, and emergency spillway be constructed. The existing A-3 Basin channel is lined and this existing HDPE liner will be used in the sediment basin.

- The Contractor shall install silt fence at locations shown on the Erosion and Sediment Control Plan (Drawings) to control sediments during construction and until the site is stabilized. This will include installing and maintaining silt fence along the existing perimeter fencing at the edge of the Solutia Nitro property.

- The Contractor shall install and maintain super silt fence along the top of the riverbank where sheet flow is directed toward the Kanawha River.

- The Contractor shall install and maintain stabilized construction entrances to control tracking of sediments onto public roadways.

- The Contractor shall utilize prompt revegetation (seeding and mulching) of completed areas as each area is brought to final grade. Seeding and mulching of the completed caps and covers shall be performed in accordance with Section 1300 – Seeding and Mulching of these Specifications.

- Drainage channels and swales constructed as part of the caps and covers work shall be lined with erosion control matting. Erosion control matting shall be in accordance with Section 1700 – Surface Runoff Control System of these Specifications.

Revision of the plan and stormwater controls and BMPs by the Contractor may be necessary during the course of construction if the specified stormwater runoff effluent limits are being exceeded.

3.0 SUBMITTALS

The Contractor shall submit product information for each material proposed for use. This includes piping and materials for sediment basin principal spillways, super silt fence, silt fence, drop inlet protection materials, crushed stone, and all other materials to be incorporated in the Work. The Owner's Representative will review submittal information and provide feedback to the Contractor as to the acceptability of the proposed materials.

4.0 MATERIALS

4.1 Silt Fence

4.1.1 Silt fence materials and installation shall meet all applicable requirements of Section 642.6.5 of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, Adopted 2000.

4.1.2 Non-woven filter fabric shall be purchased in a continuous roll. Fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months construction life at temperatures ranging from 1 to 120 degrees Fahrenheit. Preferred fabrics are Mirafi 100X, Exxon GTF, or approved equal.

4.1.3 Stakes shall consist of 2-inch by 2-inch oak or 2-inch by 4-inch pine and a minimum length of 5 feet. Fasteners shall be heavy duty 1-inch staples or tie wires.

4.1.4 If steel posts (standard "U" or "T" section) are used for silt fence construction they shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.

4.1.5 "Envirofence," "Geofab," or approved equal are preferred prefabricated units.

4.2 Super Silt Fence

4.2.1 Super Silt Fence shall consist of fabric mounted against 48-inch high chain link fence meeting the requirements of Section 712 of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, Adopted 2010.

4.2.2 The fabric shall meet the requirements of Section 642.6.5, AASHTO 288, Section 7, Class 1 of the WVDOH Standard Specifications for Roads and Bridges, Adopted 2010.

4.2.3 The posts shall be 2½ inches diameter by 72 inches long meeting the requirements of Section 709.46 of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, Adopted 2010. 4-inch by 4-inch by 72-inch treated wood posts may be substituted for steel posts with the approval of Solutia's Engineer.

4.2.4 Ties to connect the chain link fence to the posts and the fabrics to the chain link fence shall be approved by Solutia's Engineer.

4.3 Stabilized Construction Entrance

Stone for stabilized construction entrance shall be No. 1 coarse aggregate meeting the requirements of Section 703 of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, Adopted 2010.

4.4 Rock Check Dams

Stone for rock check dams shall have d_{50} of 4 inches. The d_{50} stone shall range in size from 3 inches minimum to 6 inches maximum diameter with no more than 10 percent by weight less than 3 inches and no more than 50 percent by weight greater than 4 inches. Stone shall have a maximum weighted loss of 12 percent when subjected to five cycles of the Sodium Sulfate Soundness Test – ASTM C88 (Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate), as modified by the American Association of State Highway and Transportation Officials (AASHTO) T-104.

4.5 Principal Spillways

Principal pipe spillways shall be constructed using the materials shown on the Drawings and described in the Technical Specifications. The Drawings show the main components and do not necessarily show every item required for a proper installation. The Contractor is responsible for supplying all of the materials required so that the principal spillways are completely operational and constructed with a high level of workmanship. The Drawings do not show fasteners, valve stem support brackets, details of the walkway/platform/stairs system to access spillway valves, and other details. The Contractor is responsible to select these miscellaneous materials and provide information regarding these materials prior to purchase, assembly, and/or delivery.

4.5.1 Pre-Cast Concrete Riser

Pre-cast concrete riser structures shall be in accordance with the Drawings and shall meet the requirements for new inlet structures as contained in Section 605, Manholes and Inlets, of the WVDOH Standard Specifications for Roads and Bridges, adopted 2010. Generally, precast riser structures shall be constructed in the same manner as a WVDOH modified Type G Inlet. Covers and frames shall be fabricated of structural steel.

4.5.2 Corrugated Plastic Pipe

Corrugated plastic pipe (CPP) carrying flow from the concrete riser structure to the discharge or tie-in point shall be Hancor Blue Seal WT IB pipe. CPP shall be watertight according to requirements of ASTM D3212. CPP shall have a smooth interior and annular exterior corrugations and shall meet AASHTO M294, Type S or ASTM F2306.

4.5.3 Gate Valves

Gate valves shall be 8-inch flanged, resilient wedge gate valves as manufactured by Clow Valve Company. Gate valves shall be flanged, Clow Model F-6102 with 2-inch nut operator suitable for operation by a steel valve key. Contractor shall provide a gate valve key fabricated of painted steel suitable for operation of the valves from above the wooden platform. Tee handle shall be of sufficient length such that handle is 48 inches above the floor of the wooden platform/walkway.

4.5.4 Ductile Iron Flanged Pipe

Flanged lengths of ductile iron pipe to accept gate valves shall be ductile iron flanged pipe. Pipe shall be 8-inch diameter conforming to the requirements of AWWA C151. Flanges for ductile iron pipe are ductile iron in accordance with AWWA C115. Bolt holes on flanges will correspond to bolt holes on gate valve flanges. Length of ductile iron flanged pipe shall be 18 inches in length.

4.5.5 Miscellaneous Hardware

Contractor shall supply miscellaneous hardware required for principal spillway. Contractor shall provide gaskets, nuts, and bolts suitable for connecting 8-inch gate valves to 8-inch flanged ductile iron pipe.

Contractor shall supply mastic seal material to apply to joints between precast concrete riser sections where multiple sections are used. Mastic seal material shall be suitable to create a watertight seal.

Contractor shall provide suitable brackets or braces to support gate valve keys (hand operators) such that valve keys (hand operators) are held in place in an upright position and able to be turned to open and close gate valves from the fully open to fully closed position. Brackets or braces shall include fasteners suitable for attaching brackets to precast risers.

Contractor shall provide low-shrink grout made for grouting pipes into concrete inlets and manholes. Grout shall be such that 30-inch CPPs and 8-inch ductile iron pipe stubs are firmly attached to precast concrete risers and that joints are watertight and durable.

4.5.6 Pressure Treated Wood Walkways/Platforms

Contractor shall supply, fabricate, and construct steps, railings, walkway, and platforms to access concrete riser structures from the top edge of Outlet 001 and 003 sediment basins.

Pressure treated wood shall be commercially supplied lumber treated with amine copper quat (ACQ) or copper azote (CA). Contractor shall supply appropriate fasteners to attach pressure treated wood in a manner to demonstrate good workmanship and to result in a durable and safe installation, suitable to support persons using the steps, railings, walkways, and platforms. Fasteners should be designed especially for use with treated wood including coatings designed to resist corrosion.

5.0 INSTALLATION

5.1 Silt Fence

The height of silt fence above original ground shall be 16 inches, minimum, and shall not exceed 36 inches. Filter fabric shall be purchased in a continuous roll and cut to length to minimize joints. When joints are unavoidable, the silt fence shall be joined together at a support post by twisting the fence ends or last post of each run around each other and securely sealed. A trench 4 inches by 4 inches shall be excavated on the uphill side of the posts. The fabric shall be fastened securely to the uphill side of the posts and extended into the trench. Do not staple fabric to trees. The 4-inch by 4-inch trench shall be backfilled and compacted atop the fabric to eliminate under-piping. The end of fabric runs shall be turned slightly uphill to prevent runoff from going around. Silt fence shall be installed along the contour of the land with no section exceeding 5 percent slope in 20 feet.

5.2 Super Silt Fence

Super silt fence shall be installed in a manner similar to silt fence. Chain link fence shall be installed securely to the posts with wire ties. Posts shall be embedded in the ground surface a minimum of 36 inches. The fabric shall be attached to the chain link fence with ties spaced every 24 inches at the top and mid-section of the fence. A trench 12 inches by 12 inches shall be excavated on the uphill side of the posts. The fabric and fence shall be fastened securely to the uphill side of the posts and extended 12 inches, minimum, into the trench. The 12-inch by 12-inch trench shall be backfilled and compacted against the fabric and fence to eliminate under-piping. Where two sections of fence join, they shall overlap 6 feet, minimum, and folded.

5.3 Stabilized Construction Entrance

Stabilized construction entrance shall be installed and maintained at locations shown on the Drawings or where required to avoid tracking of mud or sediments onto public roadways. The stabilized construction entrance shall be maintained by cleaning mud and sediments from the surface and/or adding new stone to the surface.

5.4 Rock Check Dams

Rock check dams shall be constructed to the dimensions and at the locations shown on the Drawings. Rock check dams shall be removed immediately prior to placement of seed and mulch and erosion control matting in drainage channels and swales.

5.5 Sediment Basins

Two sediment basins shall be constructed and operated/maintained at the locations shown on the Drawings.

5.5.1 Outlet 001 Sediment Basin

The Outlet 001 sediment basin shall be constructed by enlarging the existing sediment pond to the dimensions shown on the Drawings. Excavated materials shall be placed within the PA or PDA slurry wall areas and incorporated in the general soil fill layer for subsequent capping. Excavation shall be in accordance with Section 1100 – Earthwork of these Specifications.

The Outlet 001 sediment basin shall be lined with 40 mil HDPE geomembrane. Material and installation requirements for 40 mil HDPE geomembrane shall be as specified in Section 2000 – Low Permeability Cap of these Specifications. The subgrade to receive the 40 mil HDPE geomembrane (basin bottom and sideslopes) shall be prepared in a firm and smooth condition. Geomembrane shall be laid smooth and panels joined by seaming. The top of the geomembrane shall be anchored in an anchor trench (3 feet deep) along the top of the basin as shown by the Drawings.

The Outlet 001 sediment basin will include a new principal spillway discharge structure to control the water level in the sediment basin. The principal spillway shall be constructed as shown by the Drawings. The principal spillway discharge pipe shall be connected to the existing Outlet 001 drop inlet. Existing valves and concrete wingwalls shall remain. The Contractor shall excavate to uncover the side of the existing concrete drop inlet below the existing valves, and shall cut a hole to receive the corrugated plastic pipe. The Outlet 001 sediment basin principal spillway structure shall be constructed above the 40 mil HDPE geomembrane. The principal spillway pipe will pass through the geomembrane on the western end of the basin through a pipe boot fabricated of HDPE geomembrane.

The existing Outlet 001 pond is lined with HDPE geomembrane. Existing geomembrane along the existing 001 wingwalls and drop inlet shall be uncovered. The new 40 mil HDPE geomembrane shall be joined to the existing geomembrane, or the new geomembrane shall be attached to the existing wingwalls and drop inlet using batten strips.

The Contractor shall excavate the Outlet 001 sediment basin to the proposed configuration shown on the General Fill Surface and Site Plan. The excavated surface to receive the 40 mil HDPE geomembrane shall be firm, smooth, and uniform in order to receive the geomembrane covering.

The Contractor shall install the principal spillway precast concrete riser over the geomembrane. Construction methods shall not result in damage to the geomembrane. Contractor shall place precast riser on a cushion such as planking (½-inch thick oriented strand board (OSB) or equal).

Contractor shall construct pressure treated wood steps, railings, walkways, and platforms in order to provide pedestrian access from edge of sediment basin to the principal spillway riser. The Contractor is advised that a conceptual detail has been provided for this item. Contractor shall develop plans and complete installation such that steps, railings, walkways, and platforms are useable and safe for persons accessing the riser structure to open and close gate valves.

Contractor shall include adequate ballast to avoid flotation or movement of walkways and platforms.

The sediment basin shall include a grouted rock splash pad at the outlet of the 36-inch diameter CPP that discharges stormwater in the basin. The grouted rock shall be in accordance with the specifications as outlined in Section 1000 – Riverbank Armoring of these Specifications and with the dimensions and details as shown by the Drawings.

The Contractor shall be responsible for maintenance of the Outlet 001 sediment basin which shall include removing excessive accumulated sediments (as defined on the Drawings) and disposal of sediments. Sediments shall be placed in the general soil fill layer of the caps and covers.

The Outlet 001 sediment basin shall remain in service until the PA caps and covers are stabilized with vegetation. Stabilized shall be defined as the final surface having a minimum cover of at least 80 percent vegetation. Thereafter, sediments shall be consolidated in the northern end of the sediment basin, the entire basin covered with a layer of geotextile, and the entire basin covered with an 18-inch thick vegetative soil cover layer. Concurrently with consolidation of sediments in the sediment basin, the Contractor shall clean and remove sediments from the drop inlets and CPPs in the PA.

The Outlet 001 sediment basin will then remain in service throughout the one-year warranty period and thereafter.

5.5.2 Outlet 003 Sediment Basin

The Outlet 003 sediment basin shall be constructed by the Contractor by constructing an earthen berm, principal spillway, and emergency spillway at the existing lined A-3 basin drainage channel. The berm or embankment shall be constructed of clean soil to the dimensions shown on the Drawings. Excavation and fill associated with Outlet 003 sediment basin construction shall be in accordance with Section 1100 – Earthwork of these Specifications.

The existing A-3 basin channel is presently lined with HDPE geomembrane. The existing geomembrane will serve as the basin liner. The proposed basin embankment and principal spillway shall be installed above the existing geomembrane as shown by the Drawings, taking care not to damage the existing geomembrane that will contain water in the new basin.

The earthen embankment shall be covered with 40 mil HDPE geomembrane, and the new geomembrane joined to the existing geomembrane across the basin bottom and sideslopes.

The Outlet 003 sediment basin shall include grouted rock splash pads at the locations where the drainage channels/swales enter the basin and at the principal pipe spillway discharge outlet. The grouted rock splash pads shall be constructed as shown on the Drawings and using the requirements for grout and rock riprap as contained in Section 1000 – Riverbank Armoring of these Specifications.

The Contractor shall install the principal spillway precast concrete riser over the geomembrane. Construction methods shall not result in damage to the geomembrane. Contractor shall place precast riser on a cushion such as planking (½-inch thick oriented strand board (OSB) or equal).

Contractor shall construct pressure treated wood steps, railings, walkways, and platforms in order to provide pedestrian access from the edge of the basin to the principal spillway riser. The Contractor is advised that a conceptual detail has been provided for this item. Contractor shall develop plans and complete installation such that steps, railings, walkways, and platforms are useable and safe for persons accessing the riser structure to open and close gate valves.

Contractor shall excavate an open channel emergency spillway adjacent to the Outlet 003 sediment basin embankment. Contractor shall excavate spillway to the lines and grades shown. Emergency spillway shall be lined with erosion control in accordance with Section 1700 – Surface Runoff Control System of these Specifications.

The Contractor shall be responsible for maintenance of the Outlet 003 sediment basin which shall include removal of excessive accumulated sediments that interfere with operation of the basin and disposal of sediments. Sediments shall be placed in the general soil fill layer of the caps and covers.

The Outlet 003 sediment basin shall remain in service until the WTA caps and covers are stabilized with vegetation. Stabilized shall be defined as the final vegetated cover layer having a minimum vegetative cover of at least 80 percent. Thereafter, the sediment basin (including any sediments that have accumulated in the bottom of the basin) shall be covered with a layer of geotextile, and the entire basin covered with 18 inches of clean cover soil.

The Outlet 003 sediment basin will then remain in service throughout the one-year warranty period and thereafter.

6.0 MAINTENANCE

During the course of the Work, sediment control structures shall be maintained in sound condition and accumulations of silt and sediments that may threaten the effectiveness of the structure shall be removed. Silt removed from the sediment basins shall be incorporated in the general soil fill layer in conjunction with construction of the caps and covers.

Sediment control structures shall be inspected at a minimum of once every seven calendar days and within 24 hours after any storm event greater than 0.5 inches per 24-hour period. Any required repairs or maintenance shall be made immediately.

Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. If the fence is not installed on the contour (perpendicular to the flow of the water) both of these conditions can occur.

Should the fabric on a silt fence decompose or become ineffective prior to the end of the Work and the barrier still is necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event. Deposits must be removed when deposits reach approximately one-half the height of the barrier. If any section of a sediment control structure is knocked down during a rain event (because it was installed in an area of concentrated flow), then super silt fence must be installed.

7.0 REMOVAL

All erosion and sediment control devices installed for this Work shall be left in place until the vegetative cover served by that device reaches 80 percent cover. Silt fence and super silt fence shall be removed and taken to a permitted solid waste landfill for disposal.

SECTION 1700 – SURFACE RUNOFF CONTROL SYSTEM

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for the construction of surface runoff control systems intended to collect and convey stormwater runoff from the caps and covers. Included are corrugated plastic pipe (CPP) culverts, drop inlets, surface drainage channels, and drainage swales. The Work consists of furnishing all labor, equipment, and materials and performing all operations as required to construct surface runoff control systems at the Solutia Nitro property.

2.0 GENERAL

Surface runoff control systems are required in both the Process Area (PA) and the Waste Treatment Area (WTA) in order to collect surface runoff from the capped and covered areas and convey runoff to the appropriate discharge locations. The surface runoff control system in the PA will consist of CPP culverts, West Virginia Division of Highways (WVDOH) Type B Drop Inlets, WVDOH Type G Drop Inlets, and drainage swales. The surface runoff control system in the WTA will consist of surface drainage channels and drainage swales.

3.0 SUBMITTALS

The Contractor shall submit product information for each material proposed for use. This includes CPP, precast drop inlets and grates, geotextile, erosion control matting and all other materials to be incorporated in the Work.

Off-site soil borrow is required for construction of the CPPs and drop inlets in the PA and in the vegetative soil cover layer in drainage channels and drainage swales.

4.0 MATERIALS

4.1 Corrugated Plastic Pipe

Corrugated plastic pipe (CPP) shall be Hancor Blue Seal WT IB pipe for use in the PA surface runoff collection system. CPP shall be watertight according to requirements of ASTM D3212. CPP shall have a smooth interior and annular exterior corrugations and shall meet AASHTO M294, Type S or ASTM F2306.

Gaskets for CPP shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and

bell during assembly. CPP shall have a reinforced bell with a polymer composite band. The bell tolerance device shall be installed by the manufacturer.

Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 435400C except that carbon black content should not exceed 4 percent. The virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively.

4.2 Type B Drop Outlet

Type B Drop Inlet shall meet the requirements of Section 605 of West Virginia Division of Highways, Standard Specifications, Roads and Bridges, adopted 2010.

4.3 Type G Drop Inlet

Type G Drop Inlet shall meet the requirements of Section 605 of West Virginia Division of Highways, Standard Specifications, Roads and Bridges, adopted 2010.

4.4 Erosion Control Matting

Erosion control matting for drainage swales and channels shall be S150BN biodegradable erosion control blanket as manufactured by North American Green or Engineer-approved equivalent.

4.5 Clean Soil Backfill

Clean soil backfill to be placed as bedding above CPP, as backfill around drop inlets, and as the vegetative soil cover layer in drainage channels and drainage swales shall be in accordance with Section 1400 – Off-site Borrow Soil of these Specifications.

4.6 Stone Bedding and Backfill

Stone bedding and backfill for CPP shall be a crusher run stone, well-graded and with a maximum particle size of 1½ inches. Sandstone or limestone aggregate will be acceptable. Section 5.1 provides additional requirements for crushed stone for CPP bedding and backfill.

5.0 CONSTRUCTION METHODS

5.1 Corrugated Plastic Pipe

Corrugated plastic pipe (CPP) shall be installed to the lines, grades, and elevations shown by the Drawings. Excavation of pipe trench shall be in accordance with Section 1100 – Earthwork of

these Specifications. Material excavated from the pipe trench shall be placed under the low permeability caps and covers.

Crushed stone bedding and backfill shall consist of a Class 1 aggregate meeting the requirements of West Virginia Division of Highways, Standard Specifications, Roads and Bridges, adopted 2010. Crushed stone bedding shall be placed over the trench bottom to a minimum depth of 6 inches. Bedding shall be lightly compacted along the sides of the trench and left loose under the pipe area as shown by the Drawings.

The pipe shall be installed on the stone bedding using care to obtain the proper alignment and grade. The pipe shall be installed in accordance with Hancor, Inc.'s installation guidelines with care taken not to damage the pipe and gasket. Special care shall be taken when joining pipe sections to protect and provide the watertight connection.

Crushed stone (Class 1 aggregate) backfill shall be placed and lightly tamped in 6-inch lifts using special care to compact aggregate around the haunches of the pipe. Compactive effort shall not damage or deflect the pipe. Crushed stone backfill shall extend to 6 inches above the top of the pipe.

Thereafter, soil from the off-site soil borrow source shall be used to complete backfilling of the trench. Soil shall be placed in maximum 12-inch loose lifts and compacted to a minimum of 90 percent of the maximum dry density.

Contractor shall remove sediment accumulated in pipes and drop inlets after completing the caps and covers work and prior to backfilling the Outlet 001 sediment basin. Sediments shall be placed in the Outlet 001 sediment basin.

5.2 Type B and Type G Drop Inlets

Type B and G drop inlets shall be constructed at the locations and elevations shown on the Drawings. Drop inlets shall be set on a bed of compacted Class 1 aggregate (crushed stone). Drop inlet shall be set such that the top is level and pipe openings aligned with pipe runs. Pipes shall be flush on the inside of the drop inlet and shall be grouted in place with a non-shrink grout especially formulated for use in manholes and drop inlets. Drop inlets shall be installed in accordance with Section 605 of West Virginia Division of Highways, Standard Specifications, Roads and Bridges, adopted 2010.

Cap system underdrains shall be connected to openings cast into the drop inlets. Six-inch polyethylene cap system underdrain pipes shall be grouted in place where they penetrate the drop inlets.

Excavations made for drop inlets shall be backfilled with soil obtained from the off-site soil borrow source. Soil shall be placed in 12-inch maximum loose lifts and each lift compacted to a minimum of 90 percent of the Standard Proctor maximum dry density. Soil shall be placed as

backfill in the CPP pipe trenches to a distance of 5 feet away from the drop inlet to create a water resistant plug outside of each drop inlet.

5.3 Drainage Swales and Channels

Drainage channels and swales shall be formed by excavating to the required swale or channel template (cross sectional dimensions) below the existing ground surface, and then constructing the various caps and covers layers to result in a channel or swale at the final grade shown on the Drawings.

Drainage channels and drainage swales shall be grass-lined and reinforced with erosion control matting. Channel and swale surfaces shall be seeded in accordance with Section 1300 – Seeding and Mulching of these Specifications. Erosion control matting shall then be installed in accordance with the manufacturer's installation guidelines.

SECTION 2000 – LOW PERMEABILITY CAP

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for the Low Permeability Cap and related work as indicated on the Drawings and as hereinafter specified. The work consists of furnishing all labor, equipment, materials, tools, services, and incidentals necessary to construct the low permeability cap covering portions of the Solutia Nitro property.

2.0 GENERAL

Low Permeability Cap shall be constructed in the following areas as shown on the Drawings.

Wastewater Treatment Area (WTA)

- Overlying the WTA-East and WTA-West Soil-Bentonite Slurry Wall Areas.

Process Area (PA)

- Overlying the Process Area (PA) Soil-Bentonite Slurry Wall Area.
- Overlying the Past Disposal Area (PDA) and western parcel of the West Virginia Alcohol Beverage Control Administration property.

The Low Permeability Cap consists of the following layers and components from the bottom to the top.

- General Soil Fill
- Geotextile Cushion
- 40-mil High Density Polyethylene (HDPE) Geomembrane
- Composite Drain Layer
- 18-inch Vegetative Soil Cover Layer

The Low Permeability Cap also includes perforated pipe drains along the down-gradient edges of cap to collect and remove runoff infiltrating through the vegetative soil cover layer. Cap underdrains are covered in Section 2030 – Cap System Underdrains of these Specifications.

3.0 SUBMITTALS

The Contractor shall submit the following information to the Solutia Representative or Solutia's Engineer for review and approval prior to delivery of materials to the site.

3.1 Borrow Soil

Solutia will be responsible to develop information required by Section 1400 – Off-site Borrow Soil, Subsection 3.0 Submittals of these Specifications for each source of off-site soil utilized for the project.

3.2 Geotextile Cushion

The Contractor shall submit product data for the nonwoven geotextiles proposed for use including manufacturer, product name, and certified material properties to demonstrate compliance with the Specifications.

3.3 40-Mil HDPE Geomembrane

The Contractor shall submit product data for the 40-mil HDPE geomembrane as follows. The Contractor shall submit the name of the HDPE geomembrane manufacturer whose product he intends to use.

The manufacturer shall have at least two years continuous experience in the manufacture of HDPE geomembrane rolls and experience totaling 10,000,000 square feet of manufactured HDPE geomembrane. The manufacturer shall allow the Owner to visit the manufacturing plant to observe all phases of production of HDPE geomembrane.

The Contractor shall submit the following information regarding the HDPE geomembrane manufacturer.

1. Information on the factory size, equipment, personnel, number of shifts per day, and capacity per shift.

2. Quality control program and written quality control/quality assurance plans.

3. A list documenting no less than 10 completed installations totaling a minimum of 2,000,000 square feet of HDPE geomembrane supplied by the manufacturer. Each entry in this list shall specify the name, purpose, location and the date of the installation; the name and address for the owner, engineer, installer, and a contact person at the facility who can discuss the project details; and the type and square footage of the geomembrane installed. A minimum of five projects and 1,000,000 square feet should be installations that used 40-mil HDPE geomembrane.

At least 10 days prior to shipment of the geomembrane from the manufacturing plant, the Contractor shall submit the following information to Solutia's Representative or Solutia's Engineer.

1. Certification that all resin used in the manufacture of geomembrane for this project meets these Specifications.

2. Copy of quality control certificates issued by the HDPE resin supplier.

3. Copy of quality control certificates for the individual rolls to be shipped for this project.

4. Proposed installation panel layout drawing identifying all seams and details. The seaming plan shall include a unique seam designation for all proposed seams.

3.4 Composite Drain Layer

The Contractor shall submit to the Solutia Representative or Solutia's Engineer for review and approval the following information prior to delivery of materials to the site.

1. Product manufacturer and name.

2. Manufacturer's quality control documentation that the specified properties have been achieved.

4.0 MATERIALS

4.1 General Soil Fill

General soil fill shall be placed to the lines and grades shown on the Drawings. General soil fill may consist of excavated soil and or "impacted material" resulting from excavations made on the Solutia Nitro property such as riverbank excavation, excavation for stormwater management systems, and/or other materials that must be relocated on the Solutia Nitro property.

These materials may require special handling if excessively wet, bulky, capable of damaging the cap layers, or other conditions. The intent of this project is that no existing soil, rock, or impacted materials be removed from the site unless specified in the Specifications or on the Drawings.

In the event that excavated soil, impacted material, debris, etc. are not available in sufficient quantity to achieve the general soil fill layer elevations, off-site soil borrow will be required to construct the general soil fill layer.

4.2 Geotextile Cushion

Geotextile to be placed as a cushion over the general soil fill layer and under the 40-mil HDPE geomembrane shall be a 12 ounce per square yard nonwoven geotextile. Geotextile cushion layer shall be GE-112 nonwoven geotextile as manufactured by SKAPS Industries of Norcross, Georgia or Engineer-approved equivalent. Nonwoven geotextile shall meet the minimum average roll values contained in Table 2000.1 below.

TABLE 2000.1
Nonwoven Geotextile Requirements for Low Permeability Cap Geotextile Cushion Layer

Property	Test Method	Units	Minimum Value
Unit Weight	ASTM D 5261	oz/yd^2	12.0
Thickness	ASTM D 5199	mils	120
Grab Tensile	ASTM D 4632	lb	330
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lb	125

4.3 40-Mil HDPE Geomembrane

4.3.1 Material Specifications

The geomembrane shall be high density polyethylene (HDPE) manufactured of new, first-quality resin produced in the United States and shall be compounded and manufactured specifically for a hydraulic barrier layer. The resin manufacturer shall certify each batch for the following properties as listed in Table 2000.2. The natural polyethylene resin without the carbon black shall meet the properties listed in Table 2000.2.

TABLE 2000.2
Required Resin Properties

Property	Test Method	Requirements
Density, g/cc	ASTM D 1505, ASTM D 4883, or ASTM D 792	0.932 – 0.940
Melt Index, g/10 min.	ASTM D 1238	<1.0

The geomembrane shall be provided on rolls having a minimum 23.0 feet seamless width, as manufactured by Poly-Flex, Inc. of Grand Prairie, Texas or Engineer-approved equivalent. Carbon black shall be added to the resin if the resin is not compounded for ultra-violet resistance.

The surface of the smooth geomembrane shall not have striations, roughness, pinholes, or bubbles.

The geomembrane shall be supplied on rolls. Labels on each roll shall identify the thickness of the material, the length and width of the roll, lot and roll numbers, and name of manufacturer.

The geomembrane and geomembrane rolls shall meet the specifications as contained in Table 2000.3.

TABLE 2000.3

Required 40-Mil Smooth HDPE Geomembrane Properties

Property	Test Method	Minimum Average Values
Thickness, mils Minimum Average Lowest Individual Reading	ASTM D 5199	 40 36
Sheet Density, g/cc	ASTM D 1505/D 792	0.940
Tensile Properties[1] 1. Yield Strength, lb/in 2. Break Strength, lb/in 3. Yield Elongation, % 4. Break Elongation, %	ASTM D 6693	 84 152 12 700
Tear Resistance, lb	ASTM D 1004	28
Puncture Resistance, lb	ASTM D 4833	72
Stress Crack Resistance[2], hrs	ASTM D 5397 (App.)	300
Carbon Black Content[3], %	ASTM D 1603	2.0 – 3.0
Carbon Black Dispersion	ASTM D 5596	See Note 4
Oxidative Induction Time (OIT) Standard OIT, Minutes	 ASTM D 3895	 100
Oven Aging at 85°C High Pressure OIT - % Retained after 90 Days	ASTM D 5721 ASTM D 5885	 80
UV Resistance[5] High Pressure OIT[6] - % Retained after 1600 Hrs	GRI GM11 ASTM D 5885	 50
Seam Properties 1. Shear Strength, lb/in 2. Peel Strength, lb/in – Hot Wedge – Extrusion Fillet	ASTM D 6392 (@ 2 in/min)	 80 60 52
Roll Dimensions 1. Width (feet) 2. Length (feet) 3. Area (square feet) 4. Gross Weight (pounds/approx.)		 23 750 17,250 3,470

1 Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of five test specimens each direction.

2 The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.

3 Other methods such as ASTM D 4218 or microwave methods are acceptable if an appropriate correlation can be established.

[4] Carbon black dispersion for 10 different views: Nine in Categories 1 and 2 with one allowed in Category 3.
[5] The condition of the test should be 20-hour UV cycle at 75°C followed by 4-hour condensation at 60°C.
[6] UV resistance is based on percent retained value regardless of the original HP-OIT value.

4.3.2 Quality Control Specifications

The geomembrane manufacturer shall have documented procedures in place to demonstrate compliance with the Quality Control Specifications outlined in this subsection.

4.3.2.1 Raw Materials

1. *Resin* – All resins for use in geomembrane must pass a candidate pre-approval process before being eligible for use. Each incoming railcar shall be sampled with the following testing performed and compared to the manufacturer's specifications:

    a. Density: ASTM D 1505.
    b. Melt Index: ASTM D 1238.
    c. Oxidative Induction Time (OIT): ASTM D 3895.

2. *Additives* – All incoming materials are to be tested and approved prior to use with the following testing performed and compared to the manufacturer's specifications:

    a. Carbon Black Content: ASTM D 1603.
    b. Oxidative Induction Time (OIT): ASTM D 3895.

4.3.2.2 Finished Product: During Production

1. *Inspection* – Performed on each roll during manufacturing.

    a. *Appearance* – Sheet surface appearance shall be monitored for flaws.
    b. *Thickness* – A full width sample shall be cut from the end of each roll for thickness measurement.

2. *Roll Identification* – Four tags per roll shall be used.

    a. Outside the core.
    b. On the core plug.
    c. On the roll surface.
    d. On the production roll sample.

3. *Out-of-Spec. Material* – Any roll not meeting the specification for any of the above inspections shall be separated from other rolls and placed on hold.

4.3.2.3 Manufacturer's Quality Control and Quality Assurance Testing

1. *Sampling* – Full width samples shall be taken as retains from the end of each roll to the manufacturer's laboratory.

2. *Testing* – The geomembrane quality control testing shall meet the following frequency requirements.

Property	Test Method	Test Frequency (min.)
Thickness (Smooth Sheet) (Textured Sheet	ASTM D 5199 ASTM D 5994	per roll
Asperity Height (Textured Sheet Only) Alternate the Measurement Side for DoubleSided Textured Sheet	ASTM D 7466	every second roll
Sheet Density	ASTM D 1505/D 792	200,000 lb (90,000 kg)
Tensile Properties 1. Yield Strength (HDPE Only) 2. Break Strength 3. Yield Elongation (HDPE Only) 4. Break Elongation	ASTM D 6693	20,000 lb (9,000 kg)
2% Modulus (LLDPE Only)	ASTM D 5323	per each formulation
Tear Resistance	ASTM D 1004	45,000 lb (20,000 kg)
Puncture Resistance	ASTM D 4833	45,000 lb (20,000 kg)
Axi-Symetric Break Strain (LLDPE Only)	ASTM D 5617	per each formulation
Stress Crack Resistance (HDPE Only)	ASTM D 5397 (App.)	per GRI GM10
Carbon Black Content	ASTM D 1603	20,000 lb (9,000 kg)
Carbon Black Dispersion	ASTM D 5596	45,000 lb (20,000 kg)
Oxidative Induction Time (OIT) Standard OIT	ASTM D 3895	200,000 lb (90,000 kg)
Oven Aging at 85°C High Pressure OIT	ASTM D 5721 ASTM D 5885	per each formulation
UV Resistance High Pressure OIT	GRI GM11 ASTM D 5885	per each formulation

3. *Welding Rod*

A sample of welding rod shall be tested at a frequency of once per 25 rolls of welding rod. The following tests shall be performed on the sample:

a.	Diameter	ASTM D 5199
b.	Density	ASTM D 1505
c.	Melt Index	ASTM D 1238
d.	Carbon Black Content	ASTM D 1603

4. *Reporting* – Results from the testing shall be reviewed by the quality control manager. The test data shall then be transferred to the product data file for roll certification. Material that does not meet specifications shall be identified and placed on hold.

4.4 Composite Drain Layer

The composite drain layer to be placed above the 40-mil smooth HDPE geomembrane shall consist of an 8-ounce per square yard nonwoven geotextile heat bonded to a HDPE drainage net. Nonwoven geotextile shall be on the top of the composite layer; the HDPE drainage net shall be installed against the 40-mil smooth HDPE geomembrane.

Composite drain layer shall comply with the requirements listed in Table 2000.4.

TABLE 2000.4
Required Composite Drain Layer Properties

Property	Test Method	Unit	Required Value with 8 Ounce/Square Yard Geotextile	Qualifier
Thickness	ASTM D 5199	mil	250±10	Range
Carbon Black	ASTM D 4218	%	2 to 3	Range
Tensile Strength	ASTM D 5035	lb/in	50	Minimum
Melt Flow	ASTM D 1238[3]	g/10 min	1	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Transmissivity[1] (net only)	ASTM D 4716	m^2/sec	$2.5x10^{-3}$	MARV[2]
Ply Adhesion (Minimum)	ASTM D 7005	lb/in	0.5	MARV
Ply Adhesion (Average)	ASTM D 7005	lb/in	1	MARV
Transmissivity[1] (composite)	ASTM D 4716	m^2/sec	$2x10^{-4}$	MARV
Geotextile				
Fabric Weight	ASTM D 5261	oz/yd^2	8	MARV
Grab Strength	ASTM D 4632	lbs	225	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Tear Strength	ASTM D 4533	lbs	90	MARV
Puncture Resistance	ASTM D 4833	gpm/ft^2	130	MARV
CBR Puncture	ASTM D 6241	lbs	650	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	100	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.26	MARV
Permeability	ASTM D 4491	cm/sec	0.3	MARV
AOS	ASTM D 4751	US Sieve	80	MARV

[1] Transmissivity measured using water at 21 ± 2°C (70 ± 4°F) with a gradient of 0.1 and a confining pressure of 10,000 psf between steel plates after 15 minutes. Values may vary between individual labs.

[2] MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

[3] Condition 190/2.16.

4.5 18-inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall consist of imported soil material capable of being placed and lightly compacted in an 18-inch thick layer without damage to the underlying geosynthetic layers. The soil shall be capable of supporting vegetation.

5.0 CONSTRUCTION METHODS

5.1 General Soil Fill

This layer can consist of excavated soil, debris, and/or "impacted material" resulting from planned or required excavations on the Solutia Nitro property. Excavated materials shall be utilized first prior to use of soil from the off-site soil borrow source.

Soil and soil-like material shall be spread in 12-inch lifts with each lift compacted to 90 percent of the materials maximum dry density as determined by the West Virginia Division of Highways' roller-pass method, MP 700.00.24, latest revision. Materials not capable of being placed and compacted to this specification shall be handled on a case-by-case basis with direction given by Solutia's Engineer. Handling of these special materials may include blending with other materials or burying in shallow excavations.

Depending on the uniformity of the excavated materials, Solutia's Engineer may approve development of a method specification for compactive effort based on construction of a test pad and satisfactory field density tests related to compactive effort.

Excavated materials which are bulky or too large to be accommodated in 12-inch lifts shall be disposed of by excavation of pits, placing the bulky materials within the pits, and covering with soil. The depth of excavated pits shall be sufficient to provide adequate depth of soil fill over the bulky materials to avoid potential impacts to or damage to the cap layers. A minimum of 12 inches of soil cover over bulky materials shall be the preferred minimum.

Where soil borrow material is utilized for the general soil fill layer, soil shall be placed and compacted in maximum 12-inch loose lifts with each lift compacted to a minimum of 90 percent of the material's maximum dry density as determined by MP 700.00.24. Construction quality control for the general soil fill layer shall include one field density test per 1,000 cubic yards of soil fill placed.

When the general soil fill layer has reached final grade as evidenced by survey data, the Contractor shall smooth roll the general soil fill surface. The Contractor shall inspect the surface and remove any rocks or debris larger than 3 inches in size. The Contractor shall then be

responsible for maintaining the condition of the general soil fill layer surface until covering with the subsequent geosynthetic layers.

5.2 Geotextile Cushion

Geotextile shall be transported, unloaded, handled, and stored at the site in such a manner to avoid damage to the geotextile material. Damaged rolls of geotextile shall be marked as such and removed from the Site. Geotextile shall be stored in protective wrapping until immediately prior to use.

Geotextile shall be positioned over the prepared surface of the general soil fill layer. The surface of the general soil fill layer shall be smooth, uniform, firm, and free of objects exceeding 3 inches in size. Panels of geotextile shall be positioned over the general soil fill surface smooth and free of wrinkles. Adjacent panels of geotextile shall be overlapped a minimum of 4 inches and seams shall be sewn using a device made for joining of geotextiles. Sewn seams shall have a stitch count of at least ten stitches per inch and shall be adequate to securely join the panels together. Minimum distance from stitched seam to edge of panel shall be 2 inches.

Damaged areas of the geotextile shall be repaired by placing a patch using the specified geotextile extending a minimum of 6 inches beyond the damage. Heat bonding can be used to secure the patch to the surrounding geotextile.

Geotextile shall be protected from damage until covering with HDPE geomembrane. Protection of the geotextile layer shall be the responsibility of the Contractor and shall include suitable temporary anchoring to prevent movement from the wind. The Contractor shall repair all damages experienced by the geotextile layer.

Exposure of the geotextile shall be limited. At no time shall the geotextile be exposed to ultraviolet light (sunlight) for a period exceeding 30 days.

The Contractor shall develop his construction methods for installation of geotextile and shall use equipment that does not damage or severely stress the underlying geomembrane layers. The Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the geomembrane for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the geomembrane by its normal operation and have such equipment removed from the work area.

5.3 40-mil Smooth HDPE Geomembrane

5.3.1 Transportation and On-Site Storage

The geomembrane rolls or panels shall be packaged and shipped by appropriate means so that no damage is caused. Transportation shall be the responsibility of the Contractor.

Off-loading and storage of the geomembrane is the responsibility of the Contractor. The Contractor shall be responsible for replacing any damaged or unacceptable material at no cost to the Owner. No off-loading shall be done unless Solutia's Engineer is present. Damage during off-loading shall be documented by Solutia's Engineer and Contractor. All damaged rolls shall be separated from the undamaged rolls until the proper disposition of that material has been determined by Solutia. Solutia will be the final authority on determination of damage.

The geomembrane shall be stored so as to be protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat, or other damage. The rolls shall be stored on a suitable surface as approved by Solutia's Engineer (not wooden pallets) and should not be stacked more than two rolls high.

5.3.2 HDPE Geomembrane Placement

Placement of the HDPE geomembrane shall require special care to avoid damaging any underlying layers. Rolls of HDPE geomembrane shall be deployed using a spreader bar assembly attached to a loader bucket or similar equipment or by other methods approved by Solutia's Engineer. The Contractor shall comply with the following:

1. No equipment or tools shall damage the geomembrane by handling, transportation, and deployment.

2. No personnel working on the geomembrane shall smoke, wear damaging shoes, or engage in other activities that could damage the geomembrane.

3. The method used to unroll the panels shall not cause scratches or crimps in the geomembrane and shall not damage the underlying layers (geotextile or general soil fill layer).

4. The method used to place the panels shall minimize wrinkles. Wrinkles shall be identified and compensation shall be made to eliminate or minimize wrinkles to the fullest extent possible. Ballast shall be used to prevent movement of the geomembrane once in the proper position.

5. Adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).

Geomembrane deployment shall proceed between ambient temperatures of 32°F to 104°F. Placement can proceed below 32°F only after it has been verified by the Engineer that the material can be seamed according to the Specifications. Geomembrane placement shall not be done during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds (in excess of 20 mph), as determined by Solutia's Engineer.

5.3.3 HDPE Field Seaming

Seams shall be oriented parallel to the line of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized.

No base T-seam shall be closer than 5 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and "fishmouths." If a fishmouth or wrinkle is found, it shall be relieved and cap stripped.

Panels of geomembrane must have a finished overlap of a minimum of 4 inches for fusion welding and 6 inches for extrusion welding, but in any event sufficient overlap shall be provided to allow peel tests to be performed on the seam.

No solvent or adhesive may be used for seaming.

All field seams shall meet the following specifications:

Seam Property	Test Method	Requirements
		40-mil HDPE Smooth
Shear Strength	ASTM D 6392 @ 2 in/min	80 lb/inch
Peel Strength	ASTM D 6392 @ 2 in/min	60 lb/inch and Film Tearing Bond for Hot Wedge (Fusion Welding) or 52 lb/inch and Film Tearing Bond for Extrusion Fillet (Extrusion Welding)

1. Shear seam specimens are 1 inch wide, with a grip separation of 4 inches plus the width of the seam. The seam is to be centered between the clamps. The grip separation rate is 2 inches per minute (ipm).

2. Both shear seam strength and peel tests shall be run on three replicate specimens. A break through the weld or at the weld sheet interface shall be considered a Non FTB (failure) in both seam strength (shear) and peel strength tests.

3. Approved field seaming processes are hot wedge (fusion) welding and extrusion fillet welding.

4. Welding rods or bead used for extrusion welding shall be HDPE and the physical properties shall be the same as those of the resin used in the manufacture of the HDPE geomembrane.

The procedure used to temporarily bond adjacent panels together shall not damage the geomembrane; in particular, the temperature of hot air at the nozzle of any spot welding apparatus shall be controlled such that the geomembrane is not damaged.

5.3.4 Field Test Seams

Approved equipment for field seaming are hot wedge (fusion) welders and extrusion fillet welders, provided that acceptable test seams are demonstrated prior to actual field seaming.

Field test seams shall be conducted on geomembrane material to verify that seaming conditions are satisfactory. Test seams shall be conducted at the beginning of each seaming period, at the Engineer's discretion, and at least once each 4 hours, for each seaming apparatus and operator combination used that day.

All test seams shall be made at a location selected by Solutia's Engineer in the area of the seaming and in contact with the subgrade. The test seam samples shall be 10 feet long for hot wedge welding and 3 feet long for extrusion welding with the seam centered lengthwise. Specimens 1 inch wide shall be cut from each opposite end of the test seam by the Contractor at locations designated by Solutia's Engineer. The Contractor shall use a tensiometer or other approved test device to test these specimens for shear and peel in the presence of Solutia's Engineer. The Contractor shall provide a calibration report for the test device utilized. Calibration shall have occurred within the previous 180 days from the time of testing. Any specimen that fails through the weld or by adhesion at the weldsheet interface is a non FTB break and shall be considered a failure. If a test seam fails to meet field seam specifications, the seaming apparatus and/or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full test seams are achieved.

5.3.5 Assessment of Seam Test Results

For both smooth and textured seams the strength of two out of three 1.0 inch (25 mm) wide strip specimens should meet or exceed values given in this Specification. The third must meet or exceed 80 percent of the given values. The shear percent elongation should exceed 50 percent. The assumed gauge length is considered to be the unseamed sheet material on either side of the welded area. Elongation measurements should be omitted for field testing. In addition, the peel separation should not exceed 25 percent based on the proportion of area of separated bond to the area of the original bonding. Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in the ASTM D 6392. In this regard, SIP is an acceptable break code.

Unacceptable Break Codes:

Hot Wedge: AD and AD-BRK > 25%
Extrusion Fillet: AD1, AD2 and AD-Weld (unless strength is achieved)

5.3.6 Non-Destructive Seam Testing

The Contractor shall non-destructively test all field seams over their full length. All test equipment, including but not limited to the following shall be furnished by the Contractor:

1. *Vacuum Box Testing:* Equipment for testing extrusion seams shall be comprised of the following:

    a. A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
    b. A steel vacuum tank and pump assembly equipped with a pressure controller and pipe connections.
    c. A rubber pressure/vacuum hose with fittings and connections.
    d. A plastic bucket and wide paint brush.
    e. A soapy solution.

    The following procedures shall be followed by the Contractor:

    a. Excess sheet overlap shall be trimmed away.
    b. Clean the window, gasket surfaces and check for leaks.
    c. Energize the vacuum pump and reduce the tank pressure to approximately 3-5 psi.
    d. Wet a strip of geomembrane approximately 12 inches by 48 inches (length of box) with the soapy solution.
    e. Place the box over the wetted area and compress.
    f. Close the bleed valve and open the vacuum valve.
    g. Ensure that a leak tight seal is created.
    h. For a period of approximately 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
    i. If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches overlap and repeat the process.
    j. All areas where soap bubbles appear shall be marked and repaired and then retested.

The following procedures shall apply to locations where seams cannot be non-destructively tested, as determined by the Engineer:

a. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation.
b. If the seam cannot be tested prior to final installation, the seaming operations shall be observed by the Engineer for uniformity and completeness.

2. *Air Pressure Testing (for double fusion seam only):* The following procedures are applicable to those processes which produce a double seam with an enclosed space.

Equipment for testing double fusion seams shall be comprised of the following:

a. An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi and mounted on a cushion to protect the geomembrane.
b. A pressure gauge equipped with a sharp hollow needle.

The following procedures shall be followed by the Contractor:

a. Seal one end of the seam to be tested.
b. Insert needle or other approved pressure feed device through the sealed end of the channel created by the double wedge fusion weld.
c. Energize the air pump to verify the unobstructed passage of air through the channel.
d. Seal the other end of the channel.
e. Energize the air pump to a pressure between 25 and 30 psi, close valve, allow 2 minutes for the injected air to come to equilibrium in the channel, and sustain pressure for approximately 5 minutes.
f. If loss of pressure exceeds 4 psi, or pressure does not stabilize, locate faulty area, repair and retest.
g. If pressure does not drop below the acceptable value after 5 minutes, cut the air channel open at the opposite end from the pressure gauge. The air channel should deflate immediately indicating that the entire length of the seam has been tested.

5.3.7 Destructive Seam Testing

The Contractor shall provide Solutia's Engineer with a minimum of one destructive test sample per 1000 feet of seam length from a location specified by Solutia's Engineer. The Contractor shall not be informed in advance of the sample location.

1. *Sampling Procedure:* In order to obtain test results prior to completion of geomembrane installation, samples shall be cut and tested by the Contractor as seaming progresses. Sampling times and locations shall be determined by Solutia's Engineer. Solutia's Engineer will witness the obtainment of all field test samples by the Contractor and the Contractor shall mark all samples with their location, roll and seam number. The Contractor shall also record in written form the date, time, location, roll seam number, and ambient temperatures. A copy of the information must be attached to each sample portion. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately repaired. All patches shall be vacuum tested.

2. *Size and Disposition of Samples:* The samples shall be 12 inches wide by 24 inches long with the seam centered lengthwise. The sample shall be cut into two equal length pieces, half to be given to Solutia's Engineer and the other half to be given to the Owner. If the Contractor desires a sample the size should be increased to 12 inches wide by 36 inches long.

3. *Field Laboratory Testing:* The Contractor shall cut ten 1-inch wide replicate specimens from Solutia's Engineer's sample and these shall be tested by the Contractor. The Contractor shall test five specimens for seam strength and five for peel strength in the presence of Solutia's Engineer. To be acceptable, four out of the five replicate test specimens must pass. Any specimen that fails through the weld or by adhesion at the weldsheet interface is a Non FTB break and shall be considered a failure.

4. *Independent Laboratory Testing:* At Solutia's discretion, Solutia's Engineer will package and ship seam samples received from the Contractor to a laboratory for the determination of shear and peel strengths. The test method and procedures to be used by the laboratory shall be the same used in field testing, where seam samples are 1 inch wide, and the grip separation rate is 2 ipm. Four of five specimens per sample shall pass.

5. *Procedures for Destructive Test Failure:* The following procedures shall apply whenever a sample fails the field destructive test or the independent laboratory test:

    a. The Contractor shall cap strip the seam between the failed location and any passed test locations.

b. The Contractor can retrace the welding path to an intermediate location (at a minimum of 10 feet from the location of the failed test), at Solutia's Engineer's discretion, and take a small sample for an additional field test. If this test passes, then the seam shall be cap stripped between that location and the original failed location. If the test fails, then the process is repeated.

c. Over the length of the seam failure, the Contractor shall either cut out the old seam, reposition the panel and reseam, or add a cap strip, as required by Solutia's Engineer.

In the event that a sample fails a laboratory destructive test, then the above procedures shall be followed, considering laboratory tests exclusively.

Solutia's Engineer will document all actions taken in conjunction with destructive test failures.

5.3.8 HDPE Geomembrane Defects and Repairs

All seams and non-seam areas of the geomembrane shall be observed by the Contractor and Solutia's Engineer for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Because light reflected by the geomembrane helps to detect defects, the surface of the geomembrane shall be clean at the time of observation. The geomembrane surface shall be brushed, blown, or washed by the Contractor if the amount of dust or mud inhibits observation. Solutia's Engineer and/or Solutia shall decide if cleaning of the geomembrane is needed to facilitate monitoring.

1. *Evaluation:* Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of Solutia's Engineer. Each location that fails the non-destructive testing shall be marked by Solutia's Engineer and repaired accordingly.

2. *Repair Procedures:*

   a. Defective seams shall be cap stripped or replaced.
   b. Small holes shall be repaired by extrusion welding a bead of extrudate over the hole. If the hole is larger than ¼ inch, it shall be patched.
   c. Tears shall be repaired by patching. Where the tear is on a slope or an area of stress and has a sharp end it must be rounded prior to patching.
   d. Blisters, large holes, or cuts and undispersed raw materials shall be repaired by patches.
   e. Surfaces of HDPE which are to be patched shall be abraded and cleaned no more than 15 minutes prior to the repair. No more than 10 percent of the thickness shall be removed by grinding. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted. The welding shall restart by grinding the existing seam and

rewelding a new seam. Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects.

f. *Verification of Repairs:* Each repair shall be non-destructively tested. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved. The Contractor shall keep daily documentation of all non-destructive and destructive testing. The documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

All patches shall be made of the same compound and thickness as the geomembrane specified. All patches shall have their top edge beveled with an angle grinder prior to placement on the geomembrane. Patches shall be applied using approved methods only.

3. *Restart/Reseaming Procedures:* The welding process shall restart by grinding the existing seam and rewelding a new seam. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted.

5.3.9 Damages

The Contractor shall develop his construction methods and shall use equipment that does not damage or severely stress the underlying geosynthetic layers. The Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the geosynthetics for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the geosynthetics by its normal operation and have such equipment removed from the work area.

5.4 Composite Drain Layer

The composite drain layer material (geotextile/HDPE drainage net) shall be transported, unloaded, handled, and stored at the site in such a manner to avoid damage to the material. Any damaged rolls shall be marked as such and removed from the site at no cost to the Owner. At no time shall the composite drain material be exposed to ultraviolet light for a period exceeding 30 days. All rolls must be stored on a suitable surface and covered to protect from precipitation, or being impacted by objectionable material.

Composite drain layer shall be installed over the HDPE geomembrane as shown on the Drawings. Panels of composite drain layer shall be carefully positioned to cover the entire area and provide the required overlaps. Composite drain layer shall be anchored or weighted to avoid problems with movement. Wrinkles and folds shall be avoided. HDPE drainage net panels shall

be joined in accordance with the manufacturer's recommendations utilizing yellow or white plastic ties spaced at no greater than 5 feet laterally and overlapping the drainage net panels a minimum of 4 inches. For end to end connections ties every 2 feet and a 12-inch overlap are required. The top geotextile overlap shall be sewn after the HDPE drainage net is tied.

The Contractor shall develop his construction methods and shall use equipment that does not damage or severely stress the underlying geomembrane. The Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the geomembrane for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the geomembrane by its normal operation and have such equipment removed from the work area.

Composite drain layer shall be cut when required using an Engineer-approved cutter. The Contractor shall use care when positioning the material to avoid damaging the materials and to avoid clogging or contaminating the drainage net with soil, mud, waste, or other objectionable matter. Any areas of damaged or contaminated composite shall be cut out, removed, and replaced by new material.

Composite drain layer panel layouts shall be designed to minimize longitudinal (end to end) joints. Composite drain layer panels shall be oriented straight down the slopes as much as practicable.

Damaged geonet composite, as identified by Solutia's Engineer, shall be repaired by the Contractor immediately. The damaged area plus an additional 1 foot around the damaged area shall be cleared of all fill material. A patch extending 1 foot beyond the perimeter of the damage shall be constructed as directed by Solutia's Engineer. Damaged material shall be replaced at the expense of the Contractor.

Cap system underdrains shall be installed above the composite drain layer as shown by the Drawings in accordance with Section 2030 – Cap System Underdrains of these Specifications.

5.5 18-Inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall be placed over the composite drain layer. Placement shall be accomplished with low ground pressure equipment. Placement and spreading equipment shall have a maximum ground pressure of 10 psi. If the Contractor desires to use rubber-tired equipment (trucks) to transport soil above the geosyntehtics, the Contractor shall increase the soil thickness while and where crossing the geosynthetics with rubber-tired haulage vehicles to maintain at least 36 inches of soil cover over the geosynthetics. Where soil develops ruts exceeding 3 inches in depth, the Contractor shall place additional soil and grade the haulage path to eliminate ruts and provide the minimum cover depth of 36 inches.

Cover material shall be placed in a single 18-inch lift thickness in advance of the spreading equipment. As an alternate, the Contractor can place a 15-inch initial soil lift followed by 3 inches of soil that may be better suited for seedbed material.

The Contractor is cautioned that equipment used to haul, place, and spread soil cover should not result in damage to the geosynthetic layers of the cap. The geosynthetics shall be monitored for any signs of stress during this operation. If it appears the geosynthetics are being put into tension or excessive stress, hauling, placing, and spreading activities shall immediately cease. Solutia's Engineer will be contacted and appropriate actions for the Contractor to remediate the situation will be decided. Any additional work necessary as a result of unsatisfactory geosynthetic stresses will be at Contractor's sole expense.

Contractor shall prepare the surface of the protective cover to aid with revegetation. Measures may include tracking the surface to loosen soil to form an acceptable seedbed. Contractor is solely responsible for maintaining the protective cover until stabilized with vegetation.

The surface of the 18-inch vegetative soil cover layer shall be limed, fertilized, seeded and mulched in accordance with Section 1300 – Seeding and Mulching of these Specifications.

SECTION 2010 – LOW PERMEABILITY COVER

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for the Low Permeability Cover and related work as indicated on the Drawings and as hereinafter specified. The work consists of furnishing all labor, equipment, materials, tools, services, and incidentals necessary to construct the low permeability cover on portions of the Solutia Nitro property.

2.0 GENERAL

Low Permeability Cover shall be constructed in the following areas as shown on the Drawings.

Wastewater Treatment Area (WTA)

- Overlying the former basins/beds at the WTA including the A-3 Basin, Equalization Basin, Emergency Basin, Surge Basin and Limestone Bed.
- Overlying two 2,4,5-T building demolition debris locations.

Process Area (PA)

- Overlying the former 2,4,5-T manufacturing area in the southeastern portion of the PA.

The Low Permeability Cover consists of the following layers and components from the bottom to the top.

- General Soil Fill
- 40-mil High Density Polyethylene (HDPE) Geomembrane
- Geotextile Cushion/Drainage Layer
- 18-inch Vegetative Soil Cover Layer

The Low Permeability Cover also consists of perforated pipe drains along the down-gradient edge of the cover to collect and remove runoff infiltrating through the vegetative soil cover layer. Cap underdrains are covered in Section 2030 – Cap System Underdrains of these Specifications.

3.0 SUBMITTALS

The Contractor shall submit the following information to the Solutia Representative or Solutia's Engineer for review and approval prior to delivery of materials to the site.

3.1 Borrow Soil

Solutia will be responsible to develop information required by Section 1400 – Off-site Borrow Soil, Subsection 3.0 Submittals of these Specifications for each source of off-site soil utilized for the project.

3.2 40-Mil HDPE Geomembrane

The Contractor shall submit product data for the 40-mil HDPE geomembrane as follows. The Contractor shall submit the name of the HDPE geomembrane manufacturer whose product he intends to use.

The manufacturer shall have at least two years continuous experience in the manufacture of HDPE geomembrane rolls and experience totaling 10,000,000 square feet of manufactured HDPE geomembrane. The manufacturer shall allow the Owner to visit the manufacturing plant to observe all phases of production of HDPE geomembrane.

The Contractor shall submit the following information regarding the HDPE geomembrane manufacturer.

1. Information on the factory size, equipment, personnel, number of shifts per day, and capacity per shift.

2. Quality control program and written quality control/quality assurance plans.

3. A list documenting no less than 10 completed installations totaling a minimum of 2,000,000 square feet of HDPE geomembrane supplied by the manufacturer. Each entry in this list shall specify the name, purpose, location and the date of the installation; the name and address for the owner, engineer, installer, and a contact person at the facility who can discuss the project details; and the type and square footage of the geomembrane installed. A minimum of five projects and 1,000,000 square feet should be installations that used 40-mil HDPE geomembrane.

At least 10 days prior to shipment of the geomembrane from the manufacturing plant, the Contractor shall submit the following information to Solutia's Representative or Solutia's Engineer.

1. Certification that all resin used in the manufacture of geomembrane for this project meets these Specifications.

2. Copy of quality control certificates issued by the HDPE resin supplier.

3. Copy of quality control certificates for the individual rolls to be shipped for this project.

4. Proposed installation panel layout drawing identifying all seams and details. The seaming plan shall include a unique seam designation for all proposed seams.

3.3 Geotextile Cushion/Drainage Layer

The Contractor shall submit product data for the nonwoven geotextile proposed for use including manufacturer, product name, and certified material properties to demonstrate compliance with the Specifications.

4.0 MATERIALS

4.1 General Soil Fill

General soil fill shall be placed to the lines and grades shown on the Drawings. General soil fill may consist of excavated soil and or "impacted material" resulting from excavations made on the Solutia Nitro property such as riverbank excavation, excavation for stormwater management systems, and/or other materials that must be relocated on the Solutia Nitro property.

These materials may require special handling if excessively wet, bulky, capable of damaging the cap layers, or other conditions. The intent of this project is that no existing soil, rock, or impacted materials be removed from the site unless specified in the Specifications or on the Drawings.

In the event that excavated soil, impacted material, debris, etc. are not available in sufficient quantity to achieve the general soil fill layer elevations, off-site soil borrow will be required to construct the general soil fill layer.

4.2 40-Mil HDPE Geomembrane

4.2.1 Material Specifications

The geomembrane shall be high density polyethylene (HDPE) manufactured of new, first-quality resin produced in the United States and shall be compounded and manufactured specifically for a hydraulic barrier layer. The resin manufacturer shall certify each batch for the following properties as listed in Table 2010.1. The natural polyethylene resin without the carbon black shall meet the properties listed in Table 2010.1.

TABLE 2010.1
Required Resin Properties

Property	Test Method	Requirements
Density, g/cc	ASTM D 1505, ASTM D 4883, or ASTM D 792	0.932 – 0.940
Melt Index, g/10 min.	ASTM D 1238	<1.0

The geomembrane shall be provided on rolls having a minimum 23.0 feet seamless width, as manufactured by Poly-Flex, Inc. of Grand Prairie, Texas or Engineer-approved equivalent. Carbon black shall be added to the resin if the resin is not compounded for ultra-violet resistance.

The surface of the smooth geomembrane shall not have striations, roughness, pinholes, or bubbles.

The geomembrane shall be supplied on rolls. Labels on each roll shall identify the thickness of the material, the length and width of the roll, lot and roll numbers, and name of manufacturer.

The geomembrane and geomembrane rolls shall meet the specifications as contained in Table 2010.2.

TABLE 2010.2
Required 40-Mil Smooth HDPE Geomembrane Properties

Property	Test Method	Minimum Average Values[1]
Thickness, mils Minimum Average Lowest Individual Reading	ASTM D 5199	 40 36
Sheet Density, g/cc	ASTM D 1505/D 792	0.940
Tensile Properties[1] 5. Yield Strength, lb/in 6. Break Strength, lb/in 7. Yield Elongation, % 8. Break Elongation, %	ASTM D 6693	 84 152 12 700
Tear Resistance, lb	ASTM D 1004	28
Puncture Resistance, lb	ASTM D 4833	72
Stress Crack Resistance[2], hrs	ASTM D 5397 (App.)	300
Carbon Black Content[3], %	ASTM D 1603	2.0 – 3.0
Carbon Black Dispersion	ASTM D 5596	See Note 4
Oxidative Induction Time (OIT) Standard OIT, Minutes	ASTM D 3895	 100

Property	Test Method	Minimum Average Values[1]
Oven Aging at 85°C High Pressure OIT - % Retained after 90 Days	ASTM D 5721 ASTM D 5885	 80
UV Resistance[5] High Pressure OIT[6] - % Retained after 1600 Hrs	GRI GM11 ASTM D 5885	 50
Seam Properties 3. Shear Strength, lb/in 4. Peel Strength, lb/in – Hot Wedge – Extrusion Fillet	ASTM D 6392 (@ 2 in/min)	 80 60 52
Roll Dimensions 5. Width (feet) 6. Length (feet) 7. Area (square feet) 8. Gross Weight (pounds/approx.)		 23 750 17,250 3,470

1 Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of five test specimens each direction.

2 The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.

3 Other methods such as ASTM D 4218 or microwave methods are acceptable if an appropriate correlation can be established.

4 Carbon black dispersion for 10 different views: Nine in Categories 1 and 2 with one allowed in Category 3.

5 The condition of the test should be 20-hour UV cycle at 75°C followed by 4-hour condensation at 60°C.

6 UV resistance is based on percent retained value regardless of the original HP-OIT value.

4.2.2 Quality Control Specifications

The geomembrane manufacturer shall have documented procedures in place to demonstrate compliance with the Quality Control Specifications outlined in this subsection.

4.2.2.1 Raw Materials

1. *Resin* – All resins for use in geomembrane must pass a candidate pre-approval process before being eligible for use. Each incoming railcar shall be sampled with the following testing performed and compared to the manufacturer's specifications:

    a. Density: ASTM D 1505.
    b. Melt Index: ASTM D 1238.
    c. Oxidative Induction Time (OIT): ASTM D 3895.

2. *Additives* – All incoming materials are to be tested and approved prior to use with the following testing performed and compared to the manufacturer's specifications:

   a. Carbon Black Content: ASTM D 1603.
   b. Oxidative Induction Time (OIT): ASTM D 3895.

4.2.2.2 Finished Product: During Production

1. *Inspection* – Performed on each roll during manufacturing.

   a. *Appearance* – Sheet surface appearance shall be monitored for flaws.
   b. *Thickness* – A full width sample shall be cut from the end of each roll for thickness measurement.

2. *Roll Identification* – Four tags per roll shall be used.

   a. Outside the core.
   b. On the core plug.
   c. On the roll surface.
   d. On the production roll sample.

3. *Out-of-Spec. Material* – Any roll not meeting the specification for any of the above inspections shall be separated from other rolls and placed on hold.

4.2.2.3 Manufacturer's Quality Control and Quality Assurance Testing

1. *Sampling* – Full width samples shall be taken as retains from the end of each roll to the manufacturer's laboratory.

2. *Testing* – The geomembrane quality control testing shall meet the following frequency requirements.

Property	Test Method	Test Frequency (min.)
Thickness (Smooth Sheet) (Textured Sheet	ASTM D 5199 ASTM D 5994	per roll
Asperity Height (Textured Sheet Only) Alternate the Measurement Side for DoubleSided Textured Sheet	ASTM D 7466	every second roll
Sheet Density	ASTM D 1505/D 792	200,000 lb (90,000 kg)
Tensile Properties 5. Yield Strength (HDPE Only) 6. Break Strength 7. Yield Elongation (HDPE Only) 8. Break Elongation	ASTM D 6693	20,000 lb (9,000 kg)

Property	Test Method	Test Frequency (min.)
2% Modulus (LLDPE Only)	ASTM D 5323	per each formulation
Tear Resistance	ASTM D 1004	45,000 lb (20,000 kg)
Puncture Resistance	ASTM D 4833	45,000 lb (20,000 kg)
Axi-Symetric Break Strain (LLDPE Only)	ASTM D 5617	per each formulation
Stress Crack Resistance (HDPE Only)	ASTM D 5397 (App.)	per GRI GM10
Carbon Black Content	ASTM D 1603	20,000 lb (9,000 kg)
Carbon Black Dispersion	ASTM D 5596	45,000 lb (20,000 kg)
Oxidative Induction Time (OIT) Standard OIT	 ASTM D 3895	 200,000 lb (90,000 kg)
Oven Aging at 85°C High Pressure OIT	ASTM D 5721 ASTM D 5885	 per each formulation
UV Resistance High Pressure OIT	GRI GM11 ASTM D 5885	 per each formulation

3. *Welding Rod*

   A sample of welding rod shall be tested at a frequency of once per 25 rolls of welding rod. The following tests shall be performed on the sample:

   a. Diameter ASTM D 5199
   b. Density ASTM D 1505
   c. Melt Index ASTM D 1238
   d. Carbon Black Content ASTM D 1603

4. *Reporting* – Results from the testing shall be reviewed by the quality control manager. The test data shall then be transferred to the product data file for roll certification. Material that does not meet specifications shall be identified and placed on hold.

4.3 Geotextile Cushion/Drainage Layer

Geotextile to be placed as a cushion/drainage layer over the 40-mil HDPE geomembrane shall be a 12 ounce per square yard nonwoven geotextile. Geotextile cushion/drainage layer shall be GE-112 nonwoven geotextile as manufactured by SKAPS Industries of Norcross, Georgia or Engineer-approved equivalent. Nonwoven geotextile shall meet the minimum average roll values contained in Table 2010.3 below.

TABLE 2010.3
Nonwoven Geotextile Requirements for Low Permeability Cover Geotextile Cushion/Drainage Layer

Property	Test Method	Units	Minimum Value
Unit Weight	ASTM D 5261	oz/yd^2	12.0
Thickness	ASTM D 5199	mils	120
Grab Tensile	ASTM D 4632	lb	330
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lb	125

4.4 18-inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall consist of imported soil material capable of being placed and lightly compacted in an 18-inch thick layer without damage to the underlying geosynthetic layers. The soil shall be capable of supporting vegetation.

5.0 CONSTRUCTION METHODS

5.1 General Soil Fill

This layer can consist of excavated soil, debris, and/or "impacted material" resulting from planned or required excavations on the Solutia Nitro property. Excavated materials shall be utilized first prior to use of soil from the off-site soil borrow source.

Soil and soil-like material shall be spread in 12-inch lifts with each lift compacted to 90 percent of the materials maximum dry density as determined by the West Virginia Division of Highways' roller-pass method, MP 700.00.24, latest revision. Materials not capable of being placed and compacted to this specification shall be handled on a case-by-case basis with direction given by Solutia's Engineer. Handling of these special materials may include blending with other materials or burying in shallow excavations.

Depending on the uniformity of the excavated materials, Solutia's Engineer may approve development of a method specification for compactive effort based on construction of a test pad and satisfactory field density tests related to compactive effort.

Excavated materials which are bulky or too large to be accommodated in 12-inch lifts shall be disposed of by excavation of pits, placing the bulky materials within the pits, and covering with soil. The depth of excavated pits shall be sufficient to provide adequate depth of soil fill over the bulky materials to avoid potential impacts to or damage to the cap layers. A minimum of 12 inches of soil cover over bulky materials shall be the preferred minimum.

Where soil borrow material is utilized for the general soil fill layer, soil shall be placed and compacted in maximum 12-inch loose lifts with each lift compacted to a minimum of 90 percent of the material's maximum dry density as determined by MP 700.00.24, latest revision. Construction quality control for the general soil fill layer shall include one field density test per 1,000 cubic yards of soil fill placed.

When the general soil fill layer has reached final grade as evidenced by survey data, the Contractor shall smooth roll the general soil fill surface. The Contractor shall inspect the surface and remove any rocks or debris larger than 3 inches in size. The Contractor shall then be responsible for maintaining the condition of the general soil fill layer surface until covering with the subsequent geosynthetic layers.

5.2 40-mil Smooth HDPE Geomembrane

5.2.1 Transportation and On-Site Storage

The geomembrane rolls or panels shall be packaged and shipped by appropriate means so that no damage is caused. Transportation shall be the responsibility of the Contractor.

Off-loading and storage of the geomembrane is the responsibility of the Contractor. The Contractor shall be responsible for replacing any damaged or unacceptable material at no cost to the Owner. No off-loading shall be done unless Solutia's Engineer is present. Damage during off-loading shall be documented by Solutia's Engineer and Contractor. All damaged rolls shall be separated from the undamaged rolls until the proper disposition of that material has been determined by Solutia. Solutia will be the final authority on determination of damage.

The geomembrane shall be stored so as to be protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat, or other damage. The rolls shall be stored on a suitable surface as approved by Solutia's Engineer (not wooden pallets) and should not be stacked more than two rolls high.

5.2.2 HDPE Geomembrane Placement

Placement of the HDPE geomembrane shall require special care to avoid damaging any underlying layers. Rolls of HDPE geomembrane shall be deployed using a spreader bar assembly attached to a loader bucket or similar equipment or by other methods approved by Solutia's Engineer. Installation methods shall not cause excessive rutting of the prepared soil subgrade. Excessive rutting shall be defined at rutting to a depth of greater than 1 inch or rutting that would pond water on the surface. The Contractor shall comply with the following:

1. No equipment or tools shall damage the geomembrane by handling, transportation, and deployment.

2. No personnel working on the geomembrane shall smoke, wear damaging shoes, or engage in other activities that could damage the geomembrane.

3. The method used to unroll the panels shall not cause scratches or crimps in the geomembrane and shall not damage the underlying layers (general soil fill layer).

4. The method used to place the panels shall minimize wrinkles. Wrinkles shall be identified and compensation shall be made to eliminate or minimize wrinkles to the fullest extent possible. Ballast shall be used to prevent movement of the geomembrane once in the proper position.

5. Adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).

Geomembrane deployment shall proceed between ambient temperatures of 32°F to 104°F. Placement can proceed below 32°F only after it has been verified by the Engineer that the material can be seamed according to the Specifications. Geomembrane placement shall not be done during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds (in excess of 20 mph), as determined by Solutia's Engineer.

5.2.3 HDPE Field Seaming

Seams shall be oriented parallel to the line of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized.

No base T-seam shall be closer than 5 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and "fishmouths." If a fishmouth or wrinkle is found, it shall be relieved and cap stripped.

Panels of geomembrane must have a finished overlap of a minimum of 4 inches for fusion welding and 6 inches for extrusion welding, but in any event sufficient overlap shall be provided to allow peel tests to be performed on the seam.

No solvent or adhesive may be used for seaming.

All field seams shall meet the following specifications:

Seam Property	Test Method	Requirements
		40-mil HDPE Smooth
Shear Strength	ASTM D 6392 @ 2 in/min	80 lb/inch

Seam Property	Test Method	Requirements
		40-mil HDPE Smooth
Peel Strength	ASTM D 6392 @ 2 in/min	60 lb/inch and Film Tearing Bond for Hot Wedge (Fusion Welding) or 52 lb/inch and Film Tearing Bond for Extrusion Fillet (Extrusion Welding)

1. Shear seam specimens are 1 inch wide, with a grip separation of 4 inches plus the width of the seam. The seam is to be centered between the clamps. The grip separation rate is 2 inches per minute (ipm).

2. Both shear seam strength and peel tests shall be run on three replicate specimens. A break through the weld or at the weld sheet interface shall be considered a Non FTB (failure) in both seam strength (shear) and peel strength tests.

3. Approved field seaming processes are hot wedge (fusion) welding and extrusion fillet welding.

4. Welding rods or bead used for extrusion welding shall be HDPE and the physical properties shall be the same as those of the resin used in the manufacture of the HDPE geomembrane.

The procedure used to temporarily bond adjacent panels together shall not damage the geomembrane; in particular, the temperature of hot air at the nozzle of any spot welding apparatus shall be controlled such that the geomembrane is not damaged.

5.2.4 Field Test Seams

Approved equipment for field seaming are hot wedge (fusion) welders and extrusion fillet welders, provided that acceptable test seams are demonstrated prior to actual field seaming.

Field test seams shall be conducted on geomembrane material to verify that seaming conditions are satisfactory. Test seams shall be conducted at the beginning of each seaming period, at the Engineer's discretion, and at least once each 4 hours, for each seaming apparatus and operator combination used that day.

All test seams shall be made at a location selected by Solutia's Engineer in the area of the seaming and in contact with the subgrade. The test seam samples shall be 10 feet long for hot wedge welding and 3 feet long for extrusion welding with the seam centered lengthwise. Specimens 1 inch wide shall be cut from each opposite end of the test seam by the Contractor at locations designated by Solutia's Engineer. The Contractor shall use a tensiometer or other approved test device to test these specimens for shear and peel in the presence of Solutia's

Engineer. The Contractor shall provide a calibration report for the test device utilized. Calibration shall have occurred within the previous 180 days from the time of testing. Any specimen that fails through the weld or by adhesion at the weldsheet interface is a non FTB break and shall be considered a failure. If a test seam fails to meet field seam specifications, the seaming apparatus and/or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full test seams are achieved.

5.2.5 Assessment of Seam Test Results

For both smooth and textured seams the strength of two out of three 1.0 inch (25 mm) wide strip specimens should meet or exceed values given in this Specification. The third must meet or exceed 80 percent of the given values. The shear percent elongation should exceed 50 percent. The assumed gauge length is considered to be the unseamed sheet material on either side of the welded area. Elongation measurements should be omitted for field testing. In addition, the peel separation should not exceed 25 percent based on the proportion of area of separated bond to the area of the original bonding. Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in the ASTM D 6392. In this regard, SIP is an acceptable break code.

Unacceptable Break Codes:

Hot Wedge: AD and AD-BRK > 25%
Extrusion Fillet: AD1, AD2 and AD-Weld (unless strength is achieved)

5.2.6 Non-Destructive Seam Testing

The Contractor shall non-destructively test all field seams over their full length. All test equipment, including but not limited to the following shall be furnished by the Contractor:

1. *Vacuum Box Testing:* Equipment for testing extrusion seams shall be comprised of the following:

    a. A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
    b. A steel vacuum tank and pump assembly equipped with a pressure controller and pipe connections.
    c. A rubber pressure/vacuum hose with fittings and connections.
    d. A plastic bucket and wide paint brush.
    e. A soapy solution.

    The following procedures shall be followed by the Contractor:

    a. Excess sheet overlap shall be trimmed away.
    b. Clean the window, gasket surfaces and check for leaks.

c. Energize the vacuum pump and reduce the tank pressure to approximately 3-5 psi.
d. Wet a strip of geomembrane approximately 12 inches by 48 inches (length of box) with the soapy solution.
e. Place the box over the wetted area and compress.
f. Close the bleed valve and open the vacuum valve.
g. Ensure that a leak tight seal is created.
h. For a period of approximately 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
i. If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches overlap and repeat the process.
j. All areas where soap bubbles appear shall be marked and repaired and then retested.

The following procedures shall apply to locations where seams cannot be non-destructively tested, as determined by the Engineer:

a. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation.
b. If the seam cannot be tested prior to final installation, the seaming operations shall be observed by the Engineer for uniformity and completeness.

2. *Air Pressure Testing (for double fusion seam only):* The following procedures are applicable to those processes which produce a double seam with an enclosed space.

Equipment for testing double fusion seams shall be comprised of the following:

a. An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi and mounted on a cushion to protect the geomembrane.
b. A pressure gauge equipped with a sharp hollow needle.

The following procedures shall be followed by the Contractor:

a. Seal one end of the seam to be tested.
b. Insert needle or other approved pressure feed device through the sealed end of the channel created by the double wedge fusion weld.
c. Energize the air pump to verify the unobstructed passage of air through the channel.
d. Seal the other end of the channel.

e. Energize the air pump to a pressure between 25 and 30 psi, close valve, allow 2 minutes for the injected air to come to equilibrium in the channel, and sustain pressure for approximately 5 minutes.

f. If loss of pressure exceeds 4 psi, or pressure does not stabilize, locate faulty area, repair and retest.

g. If pressure does not drop below the acceptable value after 5 minutes, cut the air channel open at the opposite end from the pressure gauge. The air channel should deflate immediately indicating that the entire length of the seam has been tested.

5.2.7 Destructive Seam Testing

The Contractor shall provide Solutia's Engineer with a minimum of one destructive test sample per 1000 feet of seam length from a location specified by Solutia's Engineer. The Contractor shall not be informed in advance of the sample location.

1. *Sampling Procedure:* In order to obtain test results prior to completion of geomembrane installation, samples shall be cut and tested by the Contractor as seaming progresses. Sampling times and locations shall be determined by Solutia's Engineer. Solutia's Engineer will witness the obtainment of all field test samples by the Contractor and the Contractor shall mark all samples with their location, roll and seam number. The Contractor shall also record in written form the date, time, location, roll seam number, and ambient temperatures. A copy of the information must be attached to each sample portion. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately repaired. All patches shall be vacuum tested.

2. *Size and Disposition of Samples:* The samples shall be 12 inches wide by 24 inches long with the seam centered lengthwise. The sample shall be cut into two equal length pieces, half to be given to Solutia's Engineer and the other half to be given to the Owner. If the Contractor desires a sample the size should be increased to 12 inches wide by 36 inches long.

3. *Field Laboratory Testing:* The Contractor shall cut ten 1-inch wide replicate specimens from Solutia's Engineer's sample and these shall be tested by the Contractor. The Contractor shall test five specimens for seam strength and five for peel strength in the presence of Solutia's Engineer. To be acceptable, four out of the five replicate test specimens must pass. Any specimen that fails through the weld or by adhesion at the weldsheet interface is a Non FTB break and shall be considered a failure.

4. *Independent Laboratory Testing:* At Solutia's discretion, Solutia's Engineer will package and ship seam samples received from the Contractor to a laboratory for the determination of shear and peel strengths. The test method and procedures to be used by the laboratory shall be the same used in field testing, where seam

samples are 1 inch wide, and the grip separation rate is 2 ipm. Four of five specimens per sample shall pass.

5. *Procedures for Destructive Test Failure:* The following procedures shall apply whenever a sample fails the field destructive test or the independent laboratory test:

   a. The Contractor shall cap strip the seam between the failed location and any passed test locations.
   b. The Contractor can retrace the welding path to an intermediate location (at a minimum of 10 feet from the location of the failed test), at Solutia's Engineer's discretion, and take a small sample for an additional field test. If this test passes, then the seam shall be cap stripped between that location and the original failed location. If the test fails, then the process is repeated.
   c. Over the length of the seam failure, the Contractor shall either cut out the old seam, reposition the panel and reseam, or add a cap strip, as required by Solutia's Engineer.

In the event that a sample fails a laboratory destructive test, then the above procedures shall be followed, considering laboratory tests exclusively.

Solutia's Engineer will document all actions taken in conjunction with destructive test failures.

5.2.8 HDPE Geomembrane Defects and Repairs

All seams and non-seam areas of the geomembrane shall be observed by the Contractor and Solutia's Engineer for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Because light reflected by the geomembrane helps to detect defects, the surface of the geomembrane shall be clean at the time of observation. The geomembrane surface shall be brushed, blown, or washed by the Contractor if the amount of dust or mud inhibits observation. Solutia's Engineer and/or Solutia shall decide if cleaning of the geomembrane is needed to facilitate monitoring.

1. *Evaluation:* Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of Solutia's Engineer. Each location that fails the non-destructive testing shall be marked by Solutia's Engineer and repaired accordingly.

2. *Repair Procedures:*

   a. Defective seams shall be cap stripped or replaced.
   b. Small holes shall be repaired by extrusion welding a bead of extrudate over the hole. If the hole is larger than ¼ inch, it shall be patched.

c. Tears shall be repaired by patching. Where the tear is on a slope or an area of stress and has a sharp end it must be rounded prior to patching.

d. Blisters, large holes, or cuts and undispersed raw materials shall be repaired by patches.

e. Surfaces of HDPE which are to be patched shall be abraded and cleaned no more than 15 minutes prior to the repair. No more than 10 percent of the thickness shall be removed by grinding. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted. The welding shall restart by grinding the existing seam and rewelding a new seam. Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects.

f. *Verification of Repairs:* Each repair shall be non-destructively tested. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved. The Contractor shall keep daily documentation of all non-destructive and destructive testing. The documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

All patches shall be made of the same compound and thickness as the geomembrane specified. All patches shall have their top edge beveled with an angle grinder prior to placement on the geomembrane. Patches shall be applied using approved methods only.

3. *Restart/Reseaming Procedures:* The welding process shall restart by grinding the existing seam and rewelding a new seam. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted.

5.2.9 Damages

The Contractor shall develop his construction methods and shall use equipment that does not damage or severely stress the underlying soil subgrade. The Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the soil subgrade for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the soil subgrade by its normal operation and have such equipment removed from the work area.

5.3 Geotextile Cushion/Drainage Layer

Geotextile shall be transported, unloaded, handled, and stored at the site in such a manner to avoid damage to the geotextile material. Damaged rolls of geotextile shall be marked as such

and removed from the Site. Geotextile shall be stored in protective wrapping until immediately prior to use.

Geotextile shall be positioned over the completed 40-mil HDPE geomembrane. Panels of geotextile shall be positioned over the geomembrane smooth and free of wrinkles. Adjacent panels of geotextile shall be overlapped a minimum of 4 inches and seams shall be sewn using a device made for joining of geotextiles. Sewn seams shall have a stitch count of at least ten stitches per inch and shall be adequate to securely join the panels together. Minimum distance from stitched seam to edge of panel shall be 2 inches.

Damaged areas of the geotextile shall be repaired by placing a patch using the specified geotextile extending a minimum of 6 inches beyond the damage. Heat bonding can be used to secure the patch to the surrounding geotextile.

Geotextile shall be protected from damage until covering with the 18-inch vegetative soil cover layer. Protection of the geotextile layer shall be the responsibility of the Contractor and shall include suitable temporary anchoring to prevent movement from the wind. The Contractor shall repair all damages experienced by the geotextile layer.

Exposure of the geotextile shall be limited. At no time shall the geotextile be exposed to ultraviolet light (sunlight) for a period exceeding 30 days.

The Contractor shall develop his construction methods for installation of geotextile and shall use equipment that does not damage or severely stress the underlying geomembrane layers. The Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the geomembrane for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the geomembrane by its normal operation and have such equipment removed from the work area.

5.4 18-Inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall be placed over the geotextile layer. Placement shall be accomplished with low ground pressure equipment. Placement and spreading equipment shall have a maximum ground pressure of 10 psi. If the Contractor desires to use rubber-tired equipment (trucks) to transport soil above the geosyntehtics, the Contractor shall increase the soil thickness while and where crossing the geosynthetics with rubber-tired haulage vehicles to maintain at least 36 inches of soil cover over the geosynthetics. Where soil develops ruts exceeding 3 inches in depth, the Contractor shall place additional soil and grade the haulage path to eliminate ruts and provide the minimum cover depth of 36 inches.

Cover material shall be placed in a single 18-inch lift thickness in advance of the spreading equipment. As an alternate, the Contractor can place a 15-inch initial soil lift followed by 3 inches of soil that may be better suited for seedbed material.

The Contractor is cautioned that equipment used to haul, place, and spread soil cover should not result in damage to the geosynthetic layers of the cap. The geosynthetics shall be monitored for any signs of stress during this operation. If it appears the geosynthetics are being put into tension or excessive stress, hauling, placing, and spreading activities shall immediately cease. Solutia's Engineer will be contacted and appropriate actions for the Contractor to remediate the situation will be decided. Any additional work necessary as a result of unsatisfactory geosynthetic stresses will be at Contractor's sole expense.

Contractor shall prepare the surface of the protective cover to aid with revegetation. Measures may include tracking the surface to loosen soil to form an acceptable seedbed. Contractor is solely responsible for maintaining the protective cover until stabilized with vegetation.

The surface of the 18-inch vegetative soil cover layer shall be limed, fertilized, seeded and mulched in accordance with Section 1300 – Seeding and Mulching of these Specifications.

SECTION 2020 – PERMANENT PERMEABLE COVER

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for the Permanent Permeable Cover and related work as indicated on the Drawings and as hereinafter specified. The work consists of furnishing all labor, equipment, materials, tools, services, and incidentals necessary to construct the permanent permeable cover over portions of the Solutia Nitro property.

2.0 GENERAL

Permanent Permeable Cover shall be constructed in the following areas as shown on the Drawings.

Wastewater Treatment Area (WTA)

- Permanent Permeable Cover shall be constructed to cover the remainder of the WTA not capped by the low permeability cap and low permeability cover. Note that the northern portion of the WTA property does not receive a cap or cover as this area was not historically used for production or wastewater treatment and was previously utilized as a soil borrow area.

Process Area (PA)

- Permanent Permeable Cover shall be constructed to cover the remainder of the PA not capped by the low permeability cap, low permeability cover, riverbank armoring, and West Virginia Alcohol Beverage Control Administration drainage swale cover.

The Permanent Permeable Cover consists of the following layers and components from the bottom to the top.

- Prepared Subgrade (the existing ground surface)
- Geotextile Separation Layer
- 18-inch (minimum thickness) Vegetative Soil Cover Layer

Some areas of the Permanent Permeable Cover will have a vegetative soil cover layer thickness of greater than 18 inches so that the final surface is able to drain surface runoff.

3.0 SUBMITTALS

The Contractor shall submit the following information to the Solutia Representative or Solutia's Engineer for review and approval prior to delivery of materials to the site.

3.1 Borrow Soil

Solutia will be responsible to develop information required by Section 1400 – Off-site Borrow Soil, Subsection 3.0 Submittals of these Specifications for each source of off-site soil utilized for the project. Borrow soil shall be required to construct the entire amount of the vegetative soil cover layer above the geotextile separation layer, even when the layer thickness exceeds 18 inches.

3.2 Geotextile Separation Layer

The Contractor shall submit product data for the nonwoven geotextile proposed for use including manufacturer, product name, and certified material properties to demonstrate compliance with the Specifications.

4.0 MATERIALS

4.1 Geotextile Separation Layer

Geotextile to be placed as the separation layer over the prepared subgrade shall be a 12 ounce per square yard nonwoven geotextile. Geotextile cushion/drainage layer shall be GE-112 nonwoven geotextile as manufactured by SKAPS Industries of Norcross, Georgia or Engineer-approved equivalent. Nonwoven geotextile shall meet the minimum average roll values contained in Table 2020.1 below.

TABLE 2020.1
Nonwoven Geotextile Requirements for Permanent Permeable Cover Geotextile Separation Layer

Property	Test Method	Units	Minimum Value
Unit Weight	ASTM D 5261	oz/yd^2	12.0
Thickness	ASTM D 5199	mils	120
Grab Tensile	ASTM D 4632	lb	330
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lb	125

4.2 18-inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall consist of imported soil material capable of being placed and lightly compacted in an 18-inch thick layer without damage to the underlying geotextile layers. Areas of the permanent permeable cover will require a vegetative soil cover layer thickness of greater than 18 inches in order to promote surface runoff drainage across the final surface of the cover. The soil shall be capable of supporting vegetation.

5.0 CONSTRUCTION METHODS

5.1 Subgrade Preparation

The existing ground surface in the areas to receive the permanent permeable cover shall be prepared to form a suitable subgrade for installation of the geotextile separation layer and the overlying vegetative soil cover layer. In the PA and WTA, most areas to receive the permanent permeable cover are presently covered with stone, bare soil, vegetation or concrete slabs. To ready the existing ground surface to receive the geotextile separation layer, protruding objects shall be removed. Removal shall include managing these objects at the site and may include excavating, burial, and covering with soil and/or crushed stone. Vegetation shall be cut at the ground surface, mulched, and can remain on the site. The ground surface shall then be rolled with a smooth drum compactor to achieve a uniform, smooth and firm surface over which to install the geotextile separation layer.

5.2 Geotextile Separation Layer

Geotextile shall be transported, unloaded, handled, and stored at the site in such a manner to avoid damage to the geotextile material. Damaged rolls of geotextile shall be marked as such and removed from the Site. Geotextile shall be stored in protective wrapping until immediately prior to use.

Geotextile shall be positioned over the prepared subgrade. Panels of geotextile shall be positioned over the subgrade smooth and free of wrinkles. Adjacent panels of geotextile shall be overlapped a minimum of 4 inches and seams shall be sewn using a device made for joining of geotextiles. Sewn seams shall have a stitch count of at least ten stitches per inch and shall be adequate to securely join the panels together. Minimum distance from stitched seam to edge of panel shall be 2 inches.

Damaged areas of the geotextile shall be repaired by placing a patch using the specified geotextile extending a minimum of 6 inches beyond the damage. Heat bonding can be used to secure the patch to the surrounding geotextile.

Geotextile shall be protected from damage until covering with the 18-inch vegetative soil cover layer. Protection of the geotextile layer shall be the responsibility of the Contractor and shall include suitable temporary anchoring to prevent movement from the wind. The Contractor shall repair all damages experienced by the geotextile layer.

Exposure of the geotextile shall be limited. At no time shall the geotextile be exposed to ultraviolet light (sunlight) for a period exceeding 30 days.

The Contractor shall develop his construction methods for installation of geotextile and shall use equipment that does not damage or severely stress the underlying geomembrane layers. The

Owner retains the option to have areas suspected of experiencing damage or distress exposed for visual observation and physical testing. Any necessary repair work, cost of exposing the geomembrane for observation, and any other costs incurred by the Contractor shall be at the Contractor's own expense. Solutia and/or Solutia's Engineer also has the option to reject any equipment that creates damage or distress to the geomembrane by its normal operation and have such equipment removed from the work area.

5.3 18-Inch Vegetative Soil Cover Layer

The 18-inch vegetative soil cover layer shall be placed over the geotextile layer. The 18-inch thickness referenced here is the minimum thickness. Areas of the permanent permeable cover have a thickness in excess of 18 inches in order to obtain appropriate slopes and elevations of the final surface of the cover. Placement shall be accomplished with low ground pressure equipment. Placement and spreading equipment shall have a maximum ground pressure of 10 psi. If the Contractor desires to use rubber-tired equipment (trucks) to transport soil above the geosyntehtics, the Contractor shall increase the soil thickness while and where crossing the geosynthetics with rubber-tired haulage vehicles to maintain at least 36 inches of soil cover over the geosynthetics. Where soil develops ruts exceeding 3 inches in depth, the Contractor shall place additional soil and grade the haulage path to eliminate ruts and provide the minimum cover depth of 36 inches.

Cover material shall be placed in a single 18-inch lift thickness in advance of the spreading equipment. As an alternate, the Contractor can place a 15-inch initial soil lift followed by 3 inches of soil that may be better suited for seedbed material.

The Contractor is cautioned that equipment used to haul, place, and spread soil cover should not result in damage to the geosynthetic layers of the cover. The geosynthetics shall be monitored for any signs of stress during this operation. If it appears the geosynthetics are being put into tension or excessive stress, hauling, placing, and spreading activities shall immediately cease. Solutia's Engineer will be contacted and appropriate actions for the Contractor to remediate the situation will be decided. Any additional work necessary as a result of unsatisfactory geosynthetic stresses will be at Contractor's sole expense.

Contractor shall prepare the surface of the protective cover to aid with revegetation. Measures may include tracking the surface to loosen soil to form an acceptable seedbed. Contractor is solely responsible for maintaining the protective cover until stabilized with vegetation.

The surface of the 18-inch vegetative soil cover layer shall be limed, fertilized, seeded and mulched in accordance with Section 1300 – Seeding and Mulching of these Specifications.

SECTION 2030 – CAP SYSTEM UNDERDRAINS

1.0 SCOPE OF WORK

This section of the Specifications includes requirements for the cap system underdrains which are located along the down-gradient edges of the low permeability cap and low permeability cover. Cap system underdrains shall be installed as shown on the Drawings and as specified herein. The work shall consist of furnishing all labor, equipment, materials, tools, services, and incidentals necessary to construct the cap system underdrains.

2.0 GENERAL

Cap system underdrains are proposed to intercept water infiltrating through the vegetative soil cover layer and traveling laterally above the geomembrane layer. Cap system underdrains will discharge to the storm drainage pipe drop inlets in the Process Area and to surface drainage swales and to the surface in the Waste Treatment Area.

3.0 SUBMITTALS

The Contractor shall submit information to the Solutia Representative prior to beginning work on the cap system underdrains to document compliance of the cap system underdrain components with the Specifications. The following information shall be required.

- Manufacturer of 6-inch perforated pipe including wall thickness, material properties, and dimensional ratio (DR) of pipe.
- Source of No. 57 river gravel and copy of gradation test results for the source of supply.
- Certified properties of geotextile placed around the No. 57 river gravel.

4.0 MATERIALS

4.1 6-Inch Perforated Pipe

Six-inch perforated pipe shall be PE 3608 pipe as manufactured by Performance Pipe of Plano, Texas or Engineer-approved equivalent. Pipe shall have a dimension ratio (DR) of 21 or greater wall thickness. Pipe shall be perforated as shown by the Drawings.

Materials used for the manufacture of polyethylene pipe and fittings shall be PE 3608 (formerly PE 3408) high density polyethylene meeting cell classification 345464C for black per ASTM

D 3350; and shall be listed in the name of the pipe and fitting manufacturer in PPI (Plastics Pipe Institute) TR-4, *Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds*, with a standard grade HDB rating of 1600 psi at 73°F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

Polyethylene pipe shall be manufactured to the requirements of ASTM F 714 and AWWA C906-07.

Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe.

4.2 No. 57 River Gravel

Stone bedding for cap system underdrains shall meet the gradation requirements for No. 57 stone as specified in the West Virginia Division of Highways Standard Specifications for Roads and Bridges, latest edition, Section 703, Table 703.4. River gravel shall also meet the requirements of Section 703.2 of West Virginia Division of Highways Standard Specifications for Roads and Bridges, latest edition.

4.3 Geotextile

Geotextile to be placed over the river gravel underdrain bedding shall be an 8 ounce per square yard nonwoven geotextile. Geotextile shall be GE-180 nonwoven geotextile as manufactured by SKAPS Industries of Norcross, Georgia or Engineer-approved equivalent. Nonwoven geotextile shall meet the minimum average roll values contained in Table 2030.1 below.

TABLE 2030.1
Nonwoven Geotextile Requirements for Cap Drainage Systems

Property	Test Method	Units	Minimum Value
Unit Weight	ASTM D 5261	oz/yd^2	8
Thickness	ASTM D 5199	mils	100
Grab Tensile	ASTM D 4632	lb	225
Trapezoidal Tear	ASTM D 4533	lb	90
Grab Elongation	ASTM D 4632	%	50
AOS	ASTM D 4751	U.S. Sieve Size	80
Flow Rate	ASTM D 4491	$gal/min*ft^2$	100

5.0 CONSTRUCTION METHODS

5.1 6-Inch Perforated Pipe

Six-inch perforated pipe shall be installed as shown on the Drawings. Pipe sections shall be joined by butt fusion welding in accordance with ASTM F 2620. External and internal beads from fusion welding shall not be removed.

Pipe shall be handled in such a manner as to avoid damage to the pipe and the underlying geosynthetic layers when the pipe is moved into its final position. Any damage of pipe or geosynthetic layers shall be repaired by the Contractor and subsequent installation methods altered to avoid continued problems with damage.

5.2 No. 57 River Gravel

No. 57 river gravel shall be placed as bedding around the 6-inch perforated pipe as shown by the Drawings. River gravel shall be placed using methods designed to avoid damage to the pipe and underlying geosynthetic layer.

5.3 Geotextile

Geotextile shall be placed over the No. 57 river gravel as shown by the Drawings.

Geotextile shall be stored prior to use with suitable wrapping for protection against moisture, extended ultraviolet exposure, and contamination by soil or other objectionable material. If stored outdoors, wrapped rolls should be stored elevated or on a paved area free from standing water and protected with a waterproof cover.

Geotextile shall be unrolled and placed as smoothly as possible over the stone layer. Geotextile shall extend beyond the stone bedding and overlap with the geotextile of the composite drain layer (or with the geotextile cushion over the geomembrane layer in the case of the low permeability cover) a minimum of 6 inches. Geotextile shall be suitably anchored to resist movement or displacement prior to and during placement of the 18-inch vegetative soil cover layer.

Damaged geotextile, as identified by Solutia's Engineer, shall be repaired by the Contractor immediately. Repairs can include placing a patch over the damaged area with an overlap of at least 12 inches and heat bonding or sewing the patch.

Seams between panels placed longitudinally (end to end) shall include an overlap of a minimum of 12 inches and heat bonding between the geotextile panels.

5.4 Protection

The Contractor shall protect constructed cap system underdrains during and after they are constructed from damage by construction traffic. The Contractor shall use care during placement of the vegetative soil cover layer to avoid damage to or displacement of the components of the underdrains.

SECTION 2040 – FACILITY NATURAL-GAS PIPING RELOCATION

1.0 GENERAL

Teavee Oil & Gas has existing polyethylene (PE) pipes on-site that are to be relocated per the Drawings. This Specification covers this work. All work is to be inspected by Teavee Oil & Gas or its representative before covering or backfilling. The Contractor shall be responsible for installing the new PE pipes and uncovering the tie-ins to the existing pipes. Teavee Oil & Gas or its designated sub-contractor will perform the tie-overs after the pipe is pigged and pressure tested. The Contractor shall perform all of the excavation and backfill for the tie-overs. The gas service provided by Teavee Oil & Gas to the surrounding customers and industries is a 365 days per year/24 hours per day service that must be maintained as part of this project. Natural gas is provided to the industries from the two river crossings onto the site and then the pressure is regulated and split outside the fenced regulation station. All work that requires a tie in or disruption is to be done during the summer months, from May to September, subject to local demand peaks or other requirements by Teavee Oil & Gas to dictate when a tie-over can occur.

The Contractor shall be responsible for constructing a relocated system as follows:

1. Excavate and fill along route of proposed 4-inch and 6-inch gas line relocations to the final subgrade level shown on the plans. Once the proposed pipeline corridor has been brought to the required subgrade or general fill layer elevations, the proposed 4-inch and 6-inch diameter pipelines will be constructed as shown on the Drawings.

2. Construct and pressure test the relocated 6-inch HDPE gas line from the southern property boundary to the regulating station at the permanent depth of 3 feet below the final or finished grade.

3. Construct and pressure test the 4-inch HDPE gas line from the new regulating station to the tie-in point by the site entrance as shown on the Drawings at a depth of 3 feet below the final or finished grade.

4. Excavate tie-ins for the 4-inch and 6-inch pipelines at the regulating station along the top of riverbank and the 6-inch tie-in at the southern property line and the 4-inch tie-in near the entrance to the site. Teavee Oil & Gas will make the tie-ins for the 4-inch and 6-inch lines.

5. Contractor shall then backfill excavations made for 4-inch and 6-inch pipelines.

Contractor shall locate, avoid, and protect the two river crossing pipelines crossing the Kanawha River and entering the regulating station. Contractor shall avoid disturbing the fenced regulating station. Tie-ins to the regulating station will be made just outside of the existing regulating station fencing.

Alternate work plans must be approved by Solutia and Teavee Gas & Oil.

Teavee Oil & Gas Contact Steve Young, (304) 586-2151, email: coachmidget@aol.com
Current Teavee Oil & Gas Contractor: Joe Tolley Contracting, Joe Tolley (304) 545-5160

Teavee Oil & Gas has agreed that due to RCRA requirements the installation of the new gas lines necessary for the relocation of the gas lines on-site shall be performed by the Solutia contractor or its subcontractor. Teavee Oil & Gas and its contractor will perform the live tie-ins after the line has been installed and tested. Teavee Oil & Gas is to be notified so they can be present for all gas line work with a minimum of 24-hour Monday to Friday notice.

Use as shown on the Drawings either 3-inch, 4-inch or 6-inch SDR 11 PE pipe, 2406 yellow PE pipe, buried to provide a minimum of 36 inches of cover with 2-inch detectable tape buried 1 foot below the top of ground over pipe. Use select backfill with no rocks or gravel around the pipe. Pipe is to be tested at 100 psi for 1 hour minimum.

All materials, installer and welder of the pipe as part of this relocation furnished by the Contractor shall be approved by Teavee Oil & Gas prior to use.

1.1 Summary

A. Section Includes:

1. Pipes and fittings.
2. Piping specialties.
3. Piping joining materials.
4. Valves.

1.2 Performance Requirements

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig minimum unless otherwise indicated.
2. Service Regulators: 65 psig minimum unless otherwise indicated.

B. Delegated Design: Design restraints and anchors for natural-gas piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.3 Action Submittals

A. Product Data: For each type of product indicated.

B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

C. Delegated-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 Informational Submittals

A. Welding certificates.

B. Field quality-control reports.

1.5 Closeout Submittals

A. Operation and maintenance data.

1.6 Quality Assurance

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.0 PRODUCTS

2.1 Pipes and Fittings

A. PE Pipe: ASTM D 2513, SDR 11.

1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.

2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

3. Anodeless Service-Line Risers: Factory fabricated and leak tested.

   a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
   b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. Vent casing aboveground.
   c. Aboveground Portion: PE transition fitting.
   d. Outlet shall be threaded or suitable for welded connection.
   e. Tracer wire connection.
   f. Ultraviolet shield.
   g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

2.2 Piping Specialties

A. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 Joining Materials

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 Manual Gas Shutoff Valves

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.

   1. CWP Rating: 125 psig.

   2. Threaded Ends: Comply with ASME B1.20.1.

   3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.

4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.

6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

C. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. BrassCraft Manufacturing Company; a Masco company.
   b. Conbraco Industries, Inc.; Apollo Div.
   c. Lyall, R. W. & Company, Inc.
   d. McDonald, A. Y. Mfg. Co.
   e. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: Bronze, complying with ASTM B 584.

3. Ball: Chrome-plated brass.

4. Stem: Bronze; blowout proof.

5. Seats: Reinforced TFE; blowout proof.

6. Packing: Separate packnut with adjustable-stem packing threaded ends.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

8. CWP Rating: 600 psig.

9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.

10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. BrassCraft Manufacturing Company; a Masco company.
   b. Conbraco Industries, Inc.; Apollo Div.
   c. Lyall, R. W. & Company, Inc.
   d. McDonald, A. Y. Mfg. Co.
   e. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: Bronze, complying with ASTM B 584.

3. Ball: Chrome-plated bronze.

4. Stem: Bronze; blowout proof.

5. Seats: Reinforced TFE; blowout proof.

6. Packing: Threaded-body packnut design with adjustable-stem packing.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

8. CWP Rating: 600 psig.

9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.

10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Two-Piece, Regular-Port Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. BrassCraft Manufacturing Company; a Masco company.
   b. Conbraco Industries, Inc.; Apollo Div.
   c. Lyall, R. W. & Company, Inc.
   d. McDonald, A. Y. Mfg. Co.
   e. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: Bronze, complying with ASTM B 584.

3. Ball: Chrome-plated bronze.

4. Stem: Bronze; blowout proof.

5. Seats: Reinforced TFE.

6. Packing: Threaded-body packnut design with adjustable-stem packing.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

8. CWP Rating: 600 psig.

9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.

10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

F. PE Ball Valves: Comply with ASME B16.40.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Kerotest Manufacturing Corp.
   b. Lyall, R. W. & Company, Inc.
   c. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: PE.

3. Ball: PE.

4. Stem: Acetal.

5. Seats and Seals: Nitrile.

6. Ends: Plain or fusible to match piping.

7. CWP Rating: 80 psig.

8. Operating Temperature: Minus 20 to plus 140 deg F.

9. Operator: Nut or flat head for key operation.

10. Include plastic valve extension.

11. Include tamperproof locking feature for valves where indicated on Drawings.

G. Valve Boxes:

1. Cast-iron, two-section box.

2. Top section with cover with "GAS" lettering.

3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.

4. Adjustable cast-iron extensions of length required for depth of bury.

5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

2.5 Labeling and Identifying

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

3.0 EXECUTION

3.1 Outdoor Piping Installation

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches below finished grade. Comply with requirements in Section 01100 "Earthwork" for excavating, trenching, and backfilling.

1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.

2. Select backfill is required for backfilling the gas pipeline. Select backfill shall be free from rocks or gravel.

C. Install underground, PE, natural-gas piping according to ASTM D 2774.

D. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

3. Replace pipe having damaged PE coating with new pipe.

E. Install fittings for changes in direction and branch connections.

3.2 Valve Installation

A. Install underground valves with valve boxes.

B. Install anode for metallic valves in underground PE piping.

3.3 Piping Joint Construction

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.

2. Cut threads full and clean using sharp dies.

3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.

4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.

5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.

2. Bevel plain ends of steel pipe.

3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

G. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.

2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.4 Connections

A. Connect to utility's gas main according to utility's procedures and requirements.

3.5 Labeling and Identifying

A. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.6 Field Quality Control

A. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction.

B. Natural-gas piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Pipe is to be pressure tested at 100 psi for 1 hour minimum.

3.7 Outdoor Piping Schedule

A. Underground natural-gas piping shall be the following:

1. PE pipe and fittings joined by heat fusion; service-line risers with tracer wire terminated in an accessible location.

B. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.8 Underground Manual Gas Shutoff Valve Schedule

A. Connections to Existing Gas Piping: Use valve and fitting assemblies made for tapping utility's gas mains and listed by an NRTL as approved by Gas Utility.

B. Underground: PE valves.

SECTION 2100 – STONE SURFACED ACCESS ROADS

1.0 SCOPE OF WORK

Work covered in this section shall consist of the Contractor furnishing all labor, materials, tools, equipment, and services necessary to complete the construction of the stone surfaced access roads as shown by the Drawings and as approved by the Owner.

2.0 SUBMITTALS

The Contractor shall submit product information for each material proposed for use. This includes geotextile, stone, and piping.

3.0 MATERIALS

3.1 Geotextile

Geotextile for use on the stone surfaced access road subgrade shall be SKAPS W250 woven geotextile or Engineer-approved equal.

3.2 Stone

Stone for the stone surfaced access road shall consist of Class 2 aggregate base course stone, meeting the requirements of Section 307 of the West Virginia Division of Highway Standard Specifications for Roads and Bridges, latest edition.

3.3 Pipe

Pipe for the stone surfaced access road shall consist of 6-inch diameter PE 3608 pipe as manufactured by Performance Pipe of Plano, Texas or Engineer-approved equal. Pipe shall be DR21 or greater wall thickness.

4.0 METHODS

The Contractor shall prepare the access road subgrade to receive geotextile by removing all vegetation and organic material. Any soft or unsuitable material identified by the Engineer during subgrade preparation shall be removed by the Contractor and replaced with compacted suitable soil fill. Compaction of soil backfill will be in 6 inch maximum loose lifts compacted to a minimum 95 percent maximum dry density as determined by ASTM D 698.

The geotextile shall be placed over the prepared subgrade in such a manner to minimize any wrinkles or folds. Panels of geotextile shall be overlapped a minimum of 18 inches or shall be sewn in accordance with the manufacturer's recommendations.

Stone shall be placed and compacted to result in a maximum lift thickness of 6 inches as shown on the Drawings. Placement and compaction shall be completed in such a manner as to avoid damage to the geotextile. Placement and compaction of stone shall be in accordance with Section 307 of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, latest edition. Compaction shall be to a minimum of 95 percent of the maximum dry density.

HDPE pipe shall be placed under the stone at the locations shown or as directed by the Engineer to facilitate surface water runoff drainage across the road. Pipe shall be placed at the bottom of the aggregate layer and stone thickness increased in the vicinity of the pipe to provide 8 inches of cover over the pipe. Runout length on additional stone thickness shall be 20 feet each side of pipe.

SECTION 2200 – GROUNDWATER PUMPING FORCE MAIN AND WELL PIPING, WET WELLS AND VALVE VAULTS

1.0 SCOPE OF WORK

Work covered in this section shall consist of the Contractor furnishing all labor, materials, tools, equipment, and services necessary to construct 3-inch diameter polyethylene force main piping, 2-inch diameter polyethylene groundwater pumping well piping, precast concrete wet wells and valve vaults, related stainless steel piping and fittings, wooden control panels, precast concrete well vaults, and ancillary items as shown on the Drawings and described herein.

Solutia will have a well-construction contractor install groundwater pumping wells and groundwater monitoring wells on the Solutia Nitro property while the caps and covers work is ongoing. Solutia will coordinate with the Contractor to ensure that groundwater wells are installed at such time as necessary for installation of well piping and the final caps and covers. The Contractor shall be required to accommodate other contractors (groundwater well installation) on the site.

2.0 SUBMITTALS

The Contractor shall submit product information for each material proposed for use. This includes material specifications, product cut sheets, shop drawings, and other information to document the conformance of materials proposed for use with the Specifications.

Product cut sheets shall be provided for 2-inch and 3-inch diameter DR11 PE 3608 polyethylene piping and polyethylene pipe fittings.

Cut sheets and shop drawings shall be provided for precast concrete structures including concrete wet well, valve vault, and groundwater pumping well covers.

Contractor shall provide product cut sheets for stainless steel piping used from wet well and through valve vault.

Contractor shall submit product cut sheets for aluminum hatches/frames for valve vault, wet well, and groundwater pumping well vaults.

Contractor shall submit product cut sheets for manhole covers used for force main cleanout vaults.

3.0 MATERIALS

Materials required for construction of the groundwater pumping system shall be as described herein. Other materials required for a proper installation shall be provided by the Contractor as if they were specified herein.

3.1 2-inch and 3-inch Diameter Polyethylene Pipe

Pipe used for the 2-inch diameter DR11 PE 3608 pipe from the groundwater pumping wells to the pump station wet wells and pipe used for the 3-inch diameter DR11 PE 3608 force main pipe between pump stations (and from the last pump station to future treatment plant and from treatment plant to drop inlet shall be HDPE pipe and shall be as manufactured by Plexco of Bensenville, Illinois or Engineer-approved equal. HDPE pipe shall be manufactured from material meeting the requirements of ASTM D 1248, ASTM D 3350, and the ASTM Standard Thermoplastic Material Designation Code. Fittings shall be of HDPE compatible with the pipe utilized.

3.2 PE Pipe Bedding and Backfill

Bedding and backfill for 2-inch diameter and 3-inch diameter DR 11 PE 3608 pipe shall be select earthen material free from particles larger than 3 inches, and free from vegetation, organic materials, metal, and objects that may damage the piping. Bedding and backfill material shall not be frozen or excessively wet.

3.3 Magnetically Detectable Marking Tape

Contractor shall supply and install magnetically detectable marking tape above 2-inch and 3-inch PE piping. Tape shall be marked "sewer," or similar label.

3.4 Concrete Structures

Precast concrete structures include pump station wet wells, valve vaults, and force-main cleanout enclosures. Concrete structures shall be furnished by a commercial supplier of precast shapes. Concrete strength shall be a minimum of 4,000 pounds per square inch at 28 days for all concrete.

Concrete structures will be cast with lifting hooks capable of supporting the weight of the structure. Concrete structures will have a smooth finish, free from excessive honeycombs or imperfections. Wet well and valve vault shall have a bottom and sides of monolithic casting conforming to ASTM C 478.

Where piping enters/exists wet wells and valve vaults, concrete structures shall include a Z-lok or similar pipe seal detail. Z-lok boots shall be cast-in to the concrete at the time of fabrication. Concrete structures shall comply with the Drawings.

3.5 Aluminum Access Cover and Frame

Pump station wet wells and valve vaults shall be equipped with a watertight aluminum hatch cover and frame as shown by the Drawings.

The Contractor shall furnish and install aluminum access frames complete with a Neoprene seal for water tightness, hinges, hasp-equipped covers, and padlocks for the wet wells and valve vaults as dimensioned on the Drawings. Covers shall be capable of withstanding a live load of 150 pounds per square foot. Door leases shall be held upon automatically when opened to the full open position, 90 degrees, with hand release.

3.6 Internal Piping

Piping inside of wet well and valve vault, between valve vault and wet well, and outside of valve vault and wet well to the transition to polyethylene pipe shall be stainless steel for a minimum water pressure of 150 psig.

3.7 Floor Drain

The valve vault for the pump station shall have a floor drain with strainer. The drain shall be a 3-inch Schedule 40 PVC piped to the wet well. One flapper type check valve shall be installed in the drain line and secured to the wall inside the wet well.

3.8 Control Panel and Conduit

Contractor shall supply pump station control panel including 24-foot power pole, 4-inch by 4-inch pressure treated support post, 2-inch by 6-inch pressure treated boards secured to pole and posts for future mounting of control panel, meter base, junction box, etc. and 3-inch PVC Schedule 80 electrical conduit from control panel to wet well including pull chord.

3.9 Pumping Well Electric and Control Conduit

Contractor shall furnish and install two 1-inch diameter Schedule 80 PVC electrical conduits from the wet well control panel to each groundwater pumping well. Conduits at the control panel shall include turn-ups and shall extend 24 inches above final grade. Conduits shall be supplied with appropriate pull chords.

3.10 Cleanout Frame and Lid

Contractor shall provide a cast-iron manhole, frames and lids on the manhole top serving as force-main sewer cleanout vaults.

4.0 CONSTRUCTION METHODS

4.1 2-inch and 3-inch Diameter Polyethylene Pipe

Construction of the 2-inch diameter DR 11 PE 3608 pipe from the groundwater pumping wells to the pump station wet wells and 3-inch diameter DR 11 PE 3608 pipe from the pump station to pump station, pump station to future treatment location, and future treatment location to drop inlet shall be in accordance with the Drawings and as specified herein.

4.1.1 Trench Excavation

Trenches may be excavated either by hand or by the use of suitable trenching equipment as the Contractor may elect. However, some hand excavation will be necessary when so directed by the Owner, especially in the areas of existing obstructions.

Trench excavation shall proceed in advance of pipe installation only as far as can be constructed, backfilled, and compacted during the day. Trench walls shall be kept as nearly vertical as possible. Safety requirements for trenching shall comply with the West Virginia Safety Code, published by the West Virginia Department of Labor, and all other applicable rules, regulations, and standards.

The dimensions of the trench shall be such to allow construction of the piping systems in accordance with the details on the Drawings. Where necessary for protection of workmen or to avoid undermining or otherwise damaging structures or property, the trench shall be properly and sufficiently sheeted and braced to prevent caving, slipping, or cracking of the sides in accordance with applicable provisions of OSHA and the West Virginia Safety Code. Where bracing or sheeting is required or extra width is required for handling of specials, the trench shall be of extra width to accommodate this work.

The Contractor may deposit suitable excavated materials directly into permanent position when it is consistent with the proper execution of the work. Materials which cannot be placed at once in a permanent position may be deposited in temporary storage piles for later incorporation into the work.

Material suitable for backfill shall be piled in an orderly manner a sufficient distance from all trenches to prevent slides or cave-ins. All this work shall be done with reasonable neatness, and excavated materials shall not be carelessly strewn over the premises. Re-excavating material from the storage piles and any other rehandling shall be included as part of the work. Materials unsuitable for use in the permanent work shall be disposed of by dumping, spreading and compacting at approved locations, or where designated by Owner.

If the Contractor desires to waste suitable fill material, including wet material which would be acceptable when dry, he shall do so only when permission of Owner is obtained, arrangements for its disposal are completed, and replacement of this material is provided by the Contractor and approved by the Owner.

If trench bottoms become muddy, all mud shall be removed and replaced with suitable material as approved by the Owner, and compacted to a density equal to that of the surrounding undisturbed soil. Trench bottoms shall be protected against frost or freezing.

The Contractor shall at all times during construction provide proper and satisfactory means and devices for the removal of all water as fast as it may collect to avoid interference with the prosecution of the work or the proper placing of construction materials.

4.1.2 Care and Handling of Pipe

All pipe, tubing, fittings, valves, rubber gaskets, solvents, gasket lubricants, and other appurtenances shall be stored and handled in accordance with manufacturer's recommendations. Materials, if stored, shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times. All pipe and associated appurtenances shall be handled at all times in a manner that shall prevent damage to the pipe and its associated coating and lining.

4.1.3 Alignment and Grade of Pipe

The pipe shall be laid and maintained to lines and grades as shown on the Drawings and specified herein, with fittings, valves, specials and other appurtenances at the indicated locations unless otherwise directed by the Owner.

Valve operating stems shall be oriented in a manner to allow proper operation. Special precaution may need to be taken when the pipe installed is adjacent to a facility that is cathodically protected.

When obstructions that are not shown on the Drawings are encountered during the progress of work, the Contractor shall either adjust the line and grade as shown on the Drawings, or arrange to remove or relocate the obstructions, as directed by the Owner.

4.1.4 Pipe Installation

The installation of pipe including their appurtenances shall be strictly in accordance with applicable standards.

Installation of HDPE piping shall be in accordance with the manufacturer's recommendations, including those described in *Chevron's Plexco/Spirolite Engineering Manual 3, System Installation*, except where described below.

Proper implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, valves, and specials shall be carefully lowered into the trench piece by piece by means of a derrick, ropes or other Owner approved tools or equipment in such a manner as to prevent damage to the pipe. Under no

circumstances shall any pipe, fitting, valve, special or other material be dropped, dragged, or dumped into the pipe trench.

Each piece of pipe, fitting, or other material shall be carefully inspected by the Contractor for cleanliness, cracks, interior and exterior damage or other defects while suspended above the trench immediately before installation into its final position. Any defective, damaged or unsound pipe and accessories will be rejected. If any defective piece is discovered after having been laid, it shall be removed and replaced with an acceptable piece at the Contractor's expense.

The interior of the pipe shall be kept clean at all times. Openings or exposed ends of pipe, fittings, and valves shall be securely closed to preclude entrance of foreign material at any time the laying of pipe is stopped. Pipe ends left for future connections shall be valved, plugged, or capped and anchored.

As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. Pipe shall be installed so as to have continuous, even bearing on compacted bedding over the full barrel length. Clearance shall be provided to accommodate bells, joints, and couplings so as not to cause any point bearings.

Fittings and valves shall be supported as shown on the Drawings. Pipe shall then be "haunched" along its full length.

Where solvent cemented joints are required, the joint shall be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855.

When required, cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer, cutting shall be done with an Owner approved mechanical type cutter. A wheel cutter shall be used when practical.

When laying pipe, the joint and pipe deflection shall not exceed 80 percent of the manufacturer's maximum recommendations. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

Working on or walking on the pipe shall not be permitted unless a minimum of 6 inches of select aggregate has been placed and compacted over the crown of the pipe. All other pipe laying and installation practices where applicable shall be in accordance with the recommendation and installation guides of the manufacturer.

Connections between different types of pipe and accessories may be made with transition fittings as recommended by the pipe manufacturer and approved by the Owner.

Contractor shall clean all pipes after installation. Water shall be provided by the Contractor for pipe cleaning. Sediments flushed from the pipe shall be removed from downstream devices.

4.1.5 Pipe Pressure Testing (For Solid Wall Piping)

Solid wall pipe shall be hydrostatically pressure tested before being put into service. Clean water will be the medium for testing the line. Water will be induced into the section to be tested and after all free air is removed, the pressure will be raised at a steady rate to the required test pressure as recommended by the manufacturer. The size of the section to be tested shall be determined by the design limits of the pipe and test equipment capabilities. The pressure in the section being tested shall be measured at the lowest point in that section. Test pressure shall be the rated operating pressure of the pipe. Before applying final test pressure, sufficient time should be allowed for stabilization of the test medium and stabilization of diametric expansion of pipe stretching. After this equilibrium period, the test section can be returned to the recommended test pressure, the pump turned off and a final test pressure held for a minimum of one hour. Allowable amounts of makeup water for expansion and temperature variation during the pressure test is allowed based on manufacturer guidelines. If there are no visual leaks or a pressure drop outside of the range allowed by the pipe manufacturer's guidelines during the final test period, the pipeline passes the test.

The Contractor is aware that pipe system pressure testing is performed to discover unacceptable faults in a piping system and that pressure testing may cause such faults to fail by leaking or rupturing. This may result in catastrophic failure. Piping system rupture may result in the sudden, forcible, uncontrolled movement of system piping, or components, or parts of components. The Contractor will take every precaution necessary to insure the safe performance of the pressure testing operation.

4.1.6 Pipe Bedding and Backfilling Trench

The Contractor shall furnish, install, and compact pipe bedding material such that all pipe is fully supported on a bed of compacted select material.

From the bottom of the trench to the centerline of the pipe, the backfill material shall be placed in loose lifts by hand not exceeding 6 inches and each lift compacted by Owner approved mechanical tampers. From the centerline of the pipe to a minimum height of 12 inches above the pipe, the backfill material shall be placed in loose lifts by hand not exceeding 6 inches and each lift shall be thoroughly compacted by use of Owner approved mechanical tampers. Compaction of the backfill material around and above the pipe shall be to not less than 90 percent of Standard Proctor maximum dry density as determined in accordance with WVDOH Section 716.3, at a moisture content within 3 percent of optimum. The Contractor shall use special care in placing and compacting the backfill material to avoid damaging or moving the pipe.

Contractor shall place magnetically detectable warning tape in the backfill above the pipe as shown by the Drawings.

4.2 Concrete Structures

Concrete structures include precast concrete wet well, valve vault, and force main cleanout enclosures. Concrete components shall be handled in a manner as to avoid damage. Concrete structures shall be set on a prepared foundation consisting of crushed stone suitable to support each structure. Concrete structures shall be lowered into place and set so that they are properly aligned, level and plumb. Contractor shall verify position (location, elevation, alignment, levelness, etc.) and make any adjustments required.

4.3 Aluminum Access Cover and Frame

Aluminum access cover and frame shall be fastened to the concrete top of the wet well and valve vaults using stainless steel nuts and bolts and in accordance with the manufacturer's recommendations.

4.4 Other Construction

Other construction includes control panels, conduit, stainless steel piping, and piping connections/transitions. These facilities shall be installed as shown on the Drawings.

APPENDIX F

TECHNICAL SUBMITTAL REGISTER

Nitro, West Virginia RCRA Interim Measures
Final Caps and Covers Installation

Note: This technical register does not itemize information required from Bidders to be submitted with Bidder's proposals.

Item No.	Submittal Description	Reference	Date Received	Interim Status/Date	Final Status/Date (See Note 1)	Notes/Remarks
1.	Health & Safety Plan (HASP)	RFP 2.3.2				Health & Safety Plan (HASP) shall be prepared and submitted to Solutia for revew and approval.
2.	All Applicable Non-Environmental Permits Necessary to Perform Work	RFP 3.3				All non-environmental permits and approvals and Off-Site Soil Borrow Construction General Stormwater NPDES Permit.
3.	Operations Plan	RFP 3.5				Operations Plan shall be prepared and submitted to Solutia for review and approval.
4.	Proposed Substitutions for Materials or Modifications	RFP 3.4				
5.	Construction Schedule	RFP 3.7				Construction Schedule shall be updated regularly (weekly) throughout the project duration.
6.	Record Drawings	RFP 3.13				
7.	Documentation of Proper Disposal of Vegetation Removed from Riverbank	Technical Specifications Section 1000, Paragraph 3.0				
8.	Product Information for Floating Turbidity Control Curtain Wall	Technical Specifications Section 1000, Paragraphs 3.0 and 4.2				
9.	Documentation of Geotextile Properties	Technical Specifications Section 1000, Paragraphs 3.0 and 4.5				
10.	Documentation of Rock Riprap Source and Properties	Technical Specifications Section 1000, Paragraphs 3.0 and 4.3				
11.	Documentation of Super Silt Fence Components and Material Properties	Technical Specifications Section 1000, Paragraph 3.0 and Technical Specification Section 1500, Paragraphs 3.0 and 4.2				
12.	Mix Design for Grout Used in Grouted Riprap Items	Technical Specifications Section 1000, Paragraph 4.4				

Item No.	Submittal Description	Reference	Date Received	Interim Status/Date	Final Status/Date (See Note 1)	Notes/Remarks
13.	Analysis of Seed	Technical Specifications Section 1300, Paragraphs 2.0 and 3.3				
14.	Analysis of Fertilizer and Application Rate	Technical Specifications Section 1300, Paragraphs 2.0 and 3.1				
15.	Soil Analysis Results to Determine Lime Application Rate	Technical Specifications Section 1300, Paragraphs 2.0 and 3.2				
16.	Erosion and Sediment Control Materials Certifications	Technical Specifications Section 1500, Paragraph 3.0				Cut sheets, specifications, shop drawings, etc. for silt fence, super silt fence, principal spillway devices, drop inlet protection, etc.
17.	Surface Runoff Control System Product Submittals	Technical Specifications Section 1700, Paragraph 3.0				1. CPP catalog cut sheets. 2. Precast drop inlet shop drawings including grating. 3. Geotextile specifications, cut sheet. 4. Erosion control matting specifications and information. 5. Gradation for stone bedding/backfill.
18.	Geotextile for Low Permeability Cap and Low Permeability Cover and Permanent Permeable Cover	Technical Specifications Section 2000, Paragraph 3.2; Technical Specifications Section 2010, Paragraph 3.3; Technical Specifications Section 2020, Paragraph 3.3				Geotxtile product data including name, manufacturer, and certified properties.
19.	40-mil HDPE Geomembrane for Low Permeability Cap and Low Permeability Cover	Technical Specifications Section 2000, Paragraph 3.3; Technical Specifications Section 2010, Paragraph 3.3				
20.	Composite Drain Layer for Low Permeability Cap	Technical Specifications Section 2000, Paragraph 3.4				
21.	Tensiometer Calibration Report	Technical Specifications Section 2000, Paragraph 5.3.4; Technical Specifications Section 2010, Paragraph 5.2.4				

Item No.	Submittal Description	Reference	Date Received	Interim Status/Date	Final Status/Date (See Note 1)	Notes/Remarks
22.	Cap System Underdrain Materials	Technical Specifications Section 2030, Paragraph 3.0				Pipe, aggregate and geotextile information.
23.	Natural Gas Piping Relocation	Technical Specifications Section 2040, Paragraphs 1.3, 1.4, 1.5				
24.	Stone Surfaced Access Roads	Technical Specifications Section 2100, Paragraph 2.0				Product information on geotextile, aggregate, and piping.
25.	Groundwater Pumping System	Technical Specifications Section 2200, Paragraph 2.0				1. Shop drawings for valve vaults, pump station wet wells, force main vaults, and groundwater pumping well enclosures. 2. Catalog cut sheets for PE DR 11 pipe, stainless steel pipe, and PVC conduit. 3. Force main cleanout pipe fabrication details, manhole frames and lids. 4. Catalog cut sheets/fabrication details for various pipe fittings. 5. Catalog cut sheets/fabrication details for aluminum access covers/frames.

Notes: Submittal status nomenclature is as follows:

R - Reviewed
N - Reviewed and Noted
S - Resubmit
J - Rejected
I - Information Only

APPENDIX G

PROJECT CHANGE ORDER REQUEST

Date:	Change Order No.:
Project No.:	Site Name:
Description/Reason for Change:	

Change Type:

_____ Added Scope _____ Unexpected Site Conditions _____ Operating Regs.
_____ Environmental Regulatory _____ Additional Quantities _____ Design Change
_____ Other: _____

Cost Estimate:

Description	Quantity	Cost	Total	Work Terms (Unit Price, T&M, LS)
TOTAL FOR CHANGE ORDER #1A			$	

Schedule impact:

Originator:	_____	Date: _____
Oversite:	_____	Date: _____
Contractor:	_____	Date: _____
Owner:		Date:

APPENDIX H

POTESTA
Engineers and Environmental Consultants

DAILY FIELD ACTIVITY LOG

7012 MacCorkle Avenue, SE, Charleston, WV 25304 ▪ Phone: (304) 342-1400 ▪ Fax: (304) 343-9031

PROJECT NAME: _____

PROJECT NUMBER: _____

PREPARED BY: _____

DATE: _____ PAGE _____ OF _____

WEATHER CONDITIONS: _____

SITE CONDITIONS: _____

_____

PERSONNEL ON SITE:

CONTRACTOR: _____

_____

OWNER: _____

_____

VISITORS: _____

EQUIPMENT:

EQUIPMENT ON-SITE: _____

_____

_____

_____

_____

EQUIPMENT IN-USE: _____

_____

_____

_____

_____

ACTIVITIES: _____

_____

_____

_____

_____

PROJECT NAME: _____ **DATE:** _____

PROJECT NUMBER: _____ **PAGE** _____ **OF** _____

PROJECT NAME: _____ **DATE:** _____

PROJECT NUMBER: _____ **PAGE** _____ **OF** _____

PROJECT NAME: _____ **DATE:** _____

PROJECT NUMBER: _____ **PAGE** _____ **OF** _____

WORK ITEMS NOT OBSERVED: _____

PROBLEMS AND THEIR RESOLUTION: _____

ATTACHMENTS: (LIST) _____

APPENDIX I